STANDARDIZATION OF TECHNICAL MANUALS

REPORT AND HEARING

BEFORE THE

SUBCOMMITTEE FOR SPECIAL INVESTIGATIONS

OF THE

COMMITTEE ON ARMED SERVICES
HOUSE OF REPRESENTATIVES

EIGHTY-FIFTH CONGRESS

FIRST SESSION

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STANDARDIZATION OF TECHNICAL MANUALS

THURSDAY, JULY 11, 1957

HOUSE OF REPRESENTATIVES,
COMMITTEE ON ARMED SERVICES,
SUBCOMMITTEE FOR SPECIAL INVESTIGATIONS,
Washington, D. C.

The subcommittee met at 10 a. m., Hon. F. Edward Hébert (chairman of the subcommittee) presiding, and the following members present: Mr. Hess, Mr. Gavin, Mr. Cunningham, and Mr. Bates.

Mr. Devereux was also present.

Mr. HÉBERT. The committee will be in order.

The chairman desires to make a statement.

On the announced agenda of the subcommittee at the beginning of this session was "a further study of standardization methods in the Department of Defense."

Standardization as a subject is no stranger to us. This subcommittee wrote and there has been enacted into law Public Law 436 of the 82d Congress, the Defense Standardization and Cataloging Act.

On August 10, 1956, that act was codified into the laws relating to the military services, and now has the less familiar title of chapter 145 of title 10, United States Code. Section 2455 of that law requires the Secretary of Defense to report twice each year to the Armed Services Committee on the progress being made in both cataloging and standardization. We have followed those reports with great interest. Standardization is familiar ground.

In January of this year the need for standardization of manuals—shop manuals, drafting manuals, engineering drawings, and the like was again brought to the attention of the full committee by our friend and colleague, General Devereux.

In hearings he elicited from then Secretary of the Air Force and now Assistant Secretary of Defense Quarles the statement that standardization of parts and standardization of design "is a very important thing. I must say that I am glad to see you pressing for it."

On February 28, 1957, the subject was referred to this subcommittee for staff study.

We have found that shop manuals and other working manuals and data produced by individual contractors vary in contents and nomenclature.

Manufacturers (the larger, the more insistent) have a justifiable pride and possessiveness concerning their own manuals and symbols. Each generally has its own glossary of terms and symbols for the instruction of its personnel.

To each individual concern the shop language is a familiar and is a convenient means for exchange of information on the design and production methods of that company.

But the number of producers in the expanded base of defense producers left to their own choice results in a multitude of shop languages so that what is understood by the employees of factory A may be wholly unintelligible to factory B. Therefore, when employees transfer from one to the other—and skilled personnel and technically trained personnel do transfer from one to the other—each begins at the beginning in the new plant with a new language, symbols, and conventions.

There would not be much of a problem, of course, if employees did not move around. But the fact is they do, and for a variety of reasons.

Any effort to broaden the base of producers by increasing the number on competitive bidding places the prospective competitor under a handicap which inhibits him or them in bidding freely and competitively for the production of Government goods because each must learn again the language of a different and single producer.

Thus, the lack of a common language in shop manuals and on drawings for the production of Government goods has increased the cost and limited the competition which ought to prevail.

It has increased the cost directly in the time wasted by employees moving from plant to plant who must learn the language of the new plant rather than having a common language available for all Government production regardless of individual plant practices.

Furthermore, this lack of a common language increases the cost of producing defense material by creating preferred producers having the advantage of their own language and design symbols. That sets up a barrier between producer and the prospective competitor who must pay, as the price of competition, the additional cost of teaching wholly new shop procedures, languages, and symbols.

Undoubtedly the Government has initially paid a high price for not having developed and insisted upon the use of a common language by the producers of Government goods.

Without expanding the subject further, I think I have indicated to you the area of interest of this subcommittee in this study.

This morning we have invited the Bureau of Ordnance of the Navy Department to discuss its procedures with us. The Bureau of Ordnance has made substantial progress in requiring its contractors to deal in a common language in shop manuals, symbols, drawings, and design.

Their discussion this morning is intended to be a demonstration of the possibilities which are available in this field by a practical demonstration of this program in work.

I think I may say to you that the Bureau of Ordnance has been selected because by inquiry it has been found that this Bureau has achieved the greatest progress in this field of standardization.

I am happy to welcome not only the members of this subcommittee, but this morning General Devereux and our other colleagues in the House who have manifested their interest in a subject which merits our attention and interest in our war on waste and duplication.

Mr. Courtney will introduce the representatives of the Bureau, but may I say to the representatives of the Bureau who are present that we appreciate the time and effort you have expended in preparing this discussion and demonstration for us.

Mr. COURTNEY. Mr. Chairman, we have with us this morning Rear Adm. John Quinn, who sits at my right, as Deputy Chief of the

Bureau of Ordnance, and Capt. M. Pederson, Assistant Chief of the Bureau for Material, back there.

Comdr. C. W. Bunting is head of the Underwater General Engineering Branch, Research and Development Division, and will be your narrator this morning to a very large extent.

Mr. W. L. Tann is chief engineer, Material Division.

Mr. P. W. Burk is head of the Consulting Engineering and Standards Branch.

Mr. S. C. Miller, the Engineering and Drawing Section.

Mr. V. L. Johnson, an engineer in the Underwater General Engineering Branch, Research and Development Division.

Mr. M. E. Jones, Assistant Director of the Contract Division.

And Mrs. Bernice W. McGrath, who is the congressional liaison officer for the Bureau of Ordnance

Mr. HÉBERT. You may proceed, Admiral.

Mr. COURTNEY. Gentlemen, I want you to know that we have had the entire cooperation and the pleasure of having the good offices of Mrs. McGrath in assembling this galaxy of stars this morning, of which she is the most radiant. I think you gentlemen won't object to that.

Mr. HÉBERT. Admiral Quinn?

TESTIMONY OF REAR ADM. JOHN QUINN, DEPUTY CHIEF OF THE BUREAU OF ORDNANCE, DEPARTMENT OF THE NAVY; ACCOMPANIED BY CAPT. M. PEDERSON, ASSISTANT CHIEF OF THE BUREAU FOR MATERIAL; COMDR. C. W. BUNTING, HEAD, UNDERWATER GENERAL ENGINEERING BRANCH, RESEARCH AND DEVELOPMENT DIVISION; W. L. TANN, CHIEF ENGINEER, MATERIAL DIVISION; P. W. BURK, HEAD, CONSULTING ENGINEERING AND STANDARDS BRANCH; S. C. MILLER, ENGINEERING AND DRAWING SECTION; V. L. JOHNSON, UNDERWATER GENERAL ENGINEERING BRANCH, RESEARCH AND DEVELOPMENT DIVISION; M. E. JONES, ASSISTANT DIRECTOR, CONTRACT DIVISION; AND BERNICE W. McGRATH, CONGRESSIONAL LIAISON OFFICER, BUREAU OF ORDNANCE

Admiral QUINN. Mr. Chairman and members of the committee, the Chief of the Bureau, Rear Admiral Withington, has asked that I convey to you his regrets that, due to a previously scheduled trip, he is unable to be here today.

We in the Bureau appreciate having been invited to appear before you to describe the Bureau of Ordnance design disclosure package, which is intended to provide standardized guidance to our contractors in the development and production of ordnance materiel.

We feel that the design disclosure package is an effective means of communicating our requirements to our contractors and we are striving constantly to improve and refine its elements.

Comdr. C. W. Bunting, USN, who is the head of the Underwater General Engineering Branch in the Research and Development Division of the Bureau of Ordnance, will explain this method of providing standardized guidance to contractors.

Commander Bunting has, as one of his primary responsibilities, the task of insuring that adequate documentation is prepared for the manufacturers of underwater ordnance items.

When Commander Bunting has concluded, we will welcome any questions you may have. I have brought along other representatives from the Bureau who are generally conversant with the details of this work.

Now, sir, I would like to introduce Comdr. Curtis Bunting.

Mr. HÉBERT. All right, Commander.

Mr. COURTNEY. Commander.

Do you want to start with your screen?

Commander BUNTING. I want this on at all times.

Mr. COURTNEY. At all times.

You may proceed in your own way.

Commander BUNTING. Very well.

Mr. COURTNEY. Are you going to follow this text exactly?

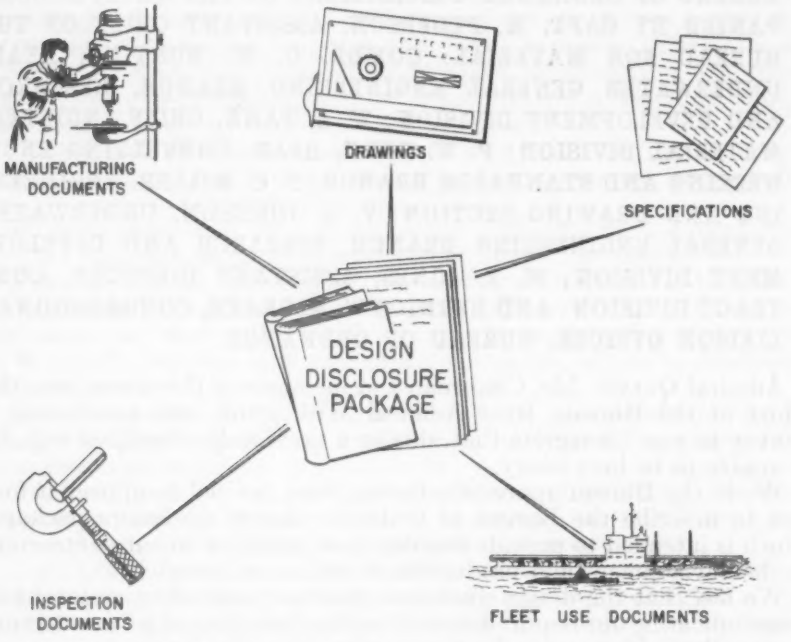
Commander BUNTING. To a great extent; yes, sir.

Mr. COURTNEY. It is up to you.

Commander BUNTING. I will talk to it, and not from it.

Mr. Chairman, and members of the committee, the Bureau of Ordnance strives to have available for each ordnance item intended for fleet use a complete design disclosure package. (See pl. I.)

PLATE I



The design disclosure package consists of specifications, drawings, manufacturing documents, inspection documents, and fleet use documents, which will provide any qualified, competent contractor with usable, accurate, and practical information with which he can produce quality ordnance items at minimum costs and in the shortest time.

To give you a better grasp of what we are talking about when we say the design disclosure package, here we have a photograph (see pl. II) of the design disclosure package for one of our aerial mines.

PLATE II

It gives you an idea of the number of drawings, packaging drawings, assembly and detail drawings, specifications, inspection sheets, and so on.

So you can see a pretty large package of paper is required to accurately define and describe one of our ordnance items.

Since the design disclosure package contains all the information required to produce an item, it enables the Bureau to obtain (see pl. III) multisource procurement when it has to go out and buy materials.

It enable us to get competitive bidding.

Likewise, it enables us to expand our production by going to additional contractors.

It also provides us with a quick alternate source in case our original contractor's plant is demolished by, for example, enemy air attack or just burns down or if some other mishap occurs.

Our great interest in having a complete documentation package is also affected by the fact that (1) a completed ordnance item usually has no commercial counterpart.

Examples are guided missiles, torpedoes, and fire-control equipments.

Fortunately, many of the subassemblies that go into our ordnance equipments do have commercial equivalents. These include electronic components, such as vacuum tubes, condensers and capacitors and such, valves, electric switches, nuts and bolts, and so on.

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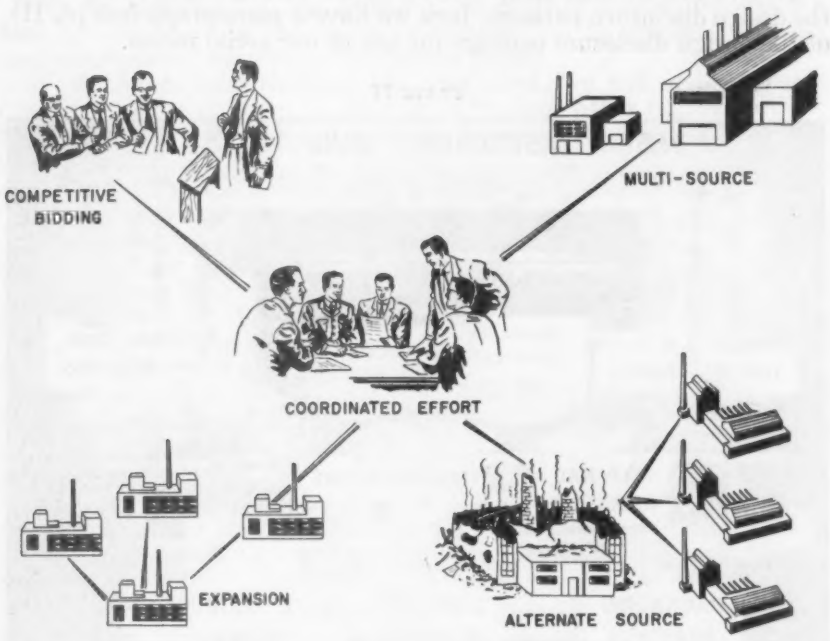
PLATE III



The Bureau uses these items in our ordnance equipments to the maximum extent practicable.

Secondly, since many of the completed ordnance items contain high explosives and/or propellants, the problem of ensuring a safety factor which will withstand service usage and environments will often preclude the use of using commercial items or at best it will require a modification to the commercial item.

The assurance of safety to fleet operating personnel requires clear, precise definitions to be set forth in our documentation to guarantee that a quality product can be produced therefrom.

Now, just what type of documents make up the design disclosure package? (See pl. IV.)

Here we have listed the major categories of documents that appear in our design disclosure package, which include specifications, drawings and lists of drawings, documents for manufacture and installation, documents for inspection procedures, documents for fleet operation use, lists of inventions, and lists of electron tubes and semiconductor devices.

The first three categories—that is, A, B, and C—are what normally make up the documentation package that we use for procurement of fleet ordnance materiel. (See pl. V.)

Now, let's take a closer look at what is included in these major categories. First, we will take specifications. Under this category we find, at the top of the list, description and requirement publications, which are preliminary specifications that contain a clear and accurate description of the technical requirements of an item; that is, the design and performance parameters, for a material, a product, or a service, and also include the procedure by which it will be determined that these requirements have been met.

PLATE IV

THE DESIGN DISCLOSURE PACKAGE

A SPECIFICATIONS

B. DRAWINGS AND LIST OF DRAWINGS

C DOCUMENTS FOR MANUFACTURE AND INSTALLATION

D DOCUMENTS FOR INSPECTION PROCEDURES

E DOCUMENTS FOR FLEET. OPERATION

F LISTS OF INVENTIONS

G LISTS OF ELECTRON TUBES AND SEMI-CONDUCTOR DEVICES

PLATE V

THE DESIGN DISCLOSURE PACKAGE

A. SPECIFICATIONS

- DESCRIPTION AND REQUIREMENTS PUBLICATIONS
- PROCUREMENT SPECIFICATIONS
- LIST OF MATERIAL SPECIFICATIONS
- LIST OF CRITICAL MATERIALS

B. DRAWINGS AND LIST OF DRAWINGS

- GENERAL DRAWINGS
- DRAWINGS OF TEST AND CHECKOUT EQUIPMENT USED BY MANUFACTURERS
- DRAWINGS OF TEST AND CHECKOUT EQUIPMENT USED BY GOVERNMENT INSPECTORS
- LISTS OF DRAWINGS

C. DOCUMENTS FOR MANUFACTURE AND INSTALLATION

- SPECIAL METHODS, PROCESSES, AND PROCEDURES
- REPRODUCTION DATA FOR THE MATERIAL DIVISION
- SYSTEM CONTROL MANUAL

These publications normally are used to procure services and material in the research and development field.

Next, we have procurement specifications, which are set forth in military specification format and contain information similar to that found in the description requirements publications, except that this information has been verified and is known to be fact as a result of a development program.

These specifications are used for the procurement of fleet-use items, and/or for items for repeated procurement.

A specific category of procurement specifications are those that define a particular material and are appropriately named "material specifications."

Since the vast majority of materials used in the manufacture of ordnance items are covered in such material specifications, much time and effort is saved by our being able to merely reference these specifications when instructing a contractor as to what materials shall be used in the manufacture of an item or when ordering materials.

A list of material specification is furnished contractors telling them the types of materials to be used in the manufacture of a product.

The last item under "Specifications" is the list of critical materials, which is a list of materials used to make a particular item that is scarce now or will become scarce in the event of mobilization.

This list is used for long-range planning in our stockpiling of critical materials, and as a basis of redesign work with the idea in mind of finding a less scarce substitute material.

In the breakdown of category B, "Drawings and list of drawings," at the top of the list we find general drawings, which are made to Bureau format and cover the detail of individual parts and include all dimensions, tolerances, notes, and other data necessary to fully describe the items, shape, size, and other characteristics as it appears in its final state.

The use of terms, legends, abbreviations, symbols, company specifications and references, any of which would not be readily understood by another manufacturer, is not permitted.

Also included under "General drawings" are what we term "military standard" drawings, which have already been prepared and depict such items as are considered standard for military usage. This would cover such items as pipefittings, nuts, bolts, valves, high performance electrical relays, and so on.

Secondly, we find drawings of test and checkout equipment used by manufacturers, which describe those special equipments used by a manufacturer during his process of manufacture which will insure that the products he makes will meet the final design acceptance requirements, as determined by Government inspection test.

These drawings are passed on to subsequent manufacturers to assist them in making the product, if they are other than the original producer.

Next, we find drawings of test and checkout equipment used by Government inspectors. These depict the equipments used in Government acceptance tests of an ordnance item.

Last, we find, under "Drawings and list of drawings," the list of drawings. These are equivalent to a table of contents of drawings used to produce a particular component or assembly.

In category C, "Documents for manufacture and installation," we find the first subcategory to be the special methods, processes and procedures. These are prepared in the form of ordnance data publications that describe the special methods, processes, and procedures used, in order to produce a particular ordnance item.

Examples of the type of information submitted would be special welding and casting techniques or the use of ceramics in the manufacture of sonar transducers. This is information that is not common knowledge to industry, and it is a process developed through our own program which we want documented so if we get another producer we can tell him how to do it and he won't have to go ahead repeating a bunch of trial-and-error methods in determining how to do the job in the best manner.

The next is "Reproduction data for Materiel Division," the Material Division of the Bureau being the division that does all the buying of fleet hardware.

This consists of shop accessory drawings covering tools, jigs, fixtures, shop process and instruction sheets, and detailed bills of materials actually used by a manufacturer to produce an ordnance item.

The systems control manual, which is the third item under the documents for manufacture and installation, contains both written and visual instructions that cover the operation, installation, checkout, and maintenance of a weapons system both during its installation and subsequent operation on board a ship.

As previously stated, in A, B, and C are those documents normally found in our production data package.

However, I don't wish to imply that each category of document described is always required because in some cases where only a simple item is to be produced, a drawing alone may suffice to effect procurement. And, on the other hand, for a complex weapons system, several thousand drawings, several dozen specifications, numerous lists of drawings and any other information available would be involved.

The next major category of documents is D, "Documents for inspection procedures." (See pl. VI.)

Under this category, we find first what we call ordnance classification of defects, which are ordnance inspection standards in the form of checkoff lists prepared for use by the Government inspectors, which indicate what has to be inspected and how it is to be inspected—that is, by visual inspection, by the use of standard measuring instruments, use of a gage, special test equipment, and so on.

In this manner, the inspector is able to determine if the particular item meets prescribed standards established for acceptance of the item by the Government.

We also find factory acceptance tests listed under inspection procedure documents. These are tests conducted by Government inspectors at the contractor's plants on large, complex, nonexpendable items such as guided-missile launchers and fire-control equipments.

At the successful completion of such tests, the particular item or equipment is readied for shipment to an installing naval shipyard. This shipment often requires the partial, or even the complete disassembly of the particular equipment in order to effect the shipment.

So these tests are the proof that the equipment performed satisfactorily at the completion of the contractor's efforts and are the basis of Government acceptance of the equipment at the contractor's plants.

PLATE VI

THE DESIGN DISCLOSURE PACKAGE

D. DOCUMENTS FOR INSPECTION PROCEDURES

ORDNANCE CLASSIFICATION OF DEFECTS
(GOVERNMENT INSPECTOR'S CHECK-OFF LIST)

FACTORY ACCEPTANCE TEST

PLATE VII

THE DESIGN DISCLOSURE PACKAGE

E. DOCUMENTS FOR FLEET OPERATION

- TEST AND CHECKOUT EQUIPMENT USED BY THE FLEET
- MAINTENANCE AND REPAIR PARTS LISTS (INCLUDING ILLUSTRATED PARTS BREAKDOWN)
- OPERATION AND MAINTENANCE MANUAL
- PRESERVATION, PACKAGING, PACKING, SHIPPING, AND STORAGE INSTRUCTIONS
- SAFETY MANUAL

F. LISTS OF INVENTIONS

G. LISTS OF ELECTRON TUBES AND SEMI-CONDUCTOR DEVICES

Next, in category E (see pl. VII) which is documents for fleet operation, we find tests and checkout equipment used by the fleet, which are usually put out in the form of drawings or publications, maintenance and repair parts lists (including illustrative parts breakdown manuals), operation and maintenance manuals, preservations, packaging, packing, shipping, and storage instructions and the safety manual.

Documents in this category are not considered as primary contractual documents used for procurement purposes. However, they do play an important part of supplying amplifying information to our contractors.

The last two categories, F, which is a list of inventions, and G, which is a list of electronic tubes and semiconductor devices, are summaries of information resulting from the research and development program.

The list of inventions is compiled for record purposes so as to protect Government rights during subsequent manufacture.

The lists of electron tubes and semiconductor devices are submitted to the Electronics Supply Office of the Bureau of Ships so as to enable that office to set up stocks of these items as may be necessary to support our ordnance equipment after it has been issued to the fleet.

That briefly, gentlemen, is what you find in the design disclosure package. (See pl. I.)

We of the Bureau of Ordnance feel that our documents must be usable by all contractors, and that the best means in which this can be accomplished is by standardizing the format and language used in these documents.

Furthermore, that our effort in this direction is intelligent standardization and not slavish standardization, in that an effective means is provided our engineers to express themselves.

The Department of Defense has made considerable progress in standardizing the policies and directives that govern the preparation of documentation.

For example, publications and instructions are now in wide use that set forth the format for production drawings, the abbreviations to be used on drawings, the use of symbols on drawings (such as welding symbols, electrical symbols, mechanical and electronic symbols), the process for revising drawings, the preparation of military specifications, and so on.

The Bureau of Ordnance has in turn amplified and augmented these basic instructions and directives by the issuance of instruction manuals and other directives that cover such items as the preparation of drawings and list of drawings, the preparation of ordnance inspection documents, the preparation of ordnance lubrication charts, the preparation of ordnance operation and maintenance manuals, and so on.

Let me show you some examples of how these various instructions and manuals have helped us to standardize and clarify our documentation picture.

First, I would like to run through the information contained in a military specification. (See pl. VIII.) By definition, a "military specification" is a clear and accurate description of the technical requirements for a material, product, or service, including the test procedure to determine the requirements are met.

PLATE VIII

SPECIFICATION

DEFINITION - - - - - - - - A CLEAR AND ACCURATE DESCRIPTION OF TECHNICAL REQUIREMENTS FOR A MATERIAL, PRODUCT, OR SERVICE, INCLUDING TEST PROCEDURE TO DETERMINE REQUIREMENTS ARE MET.

SECTION ONE - - - - - - - - DEFINES SCOPE OF SPECIFICATION.

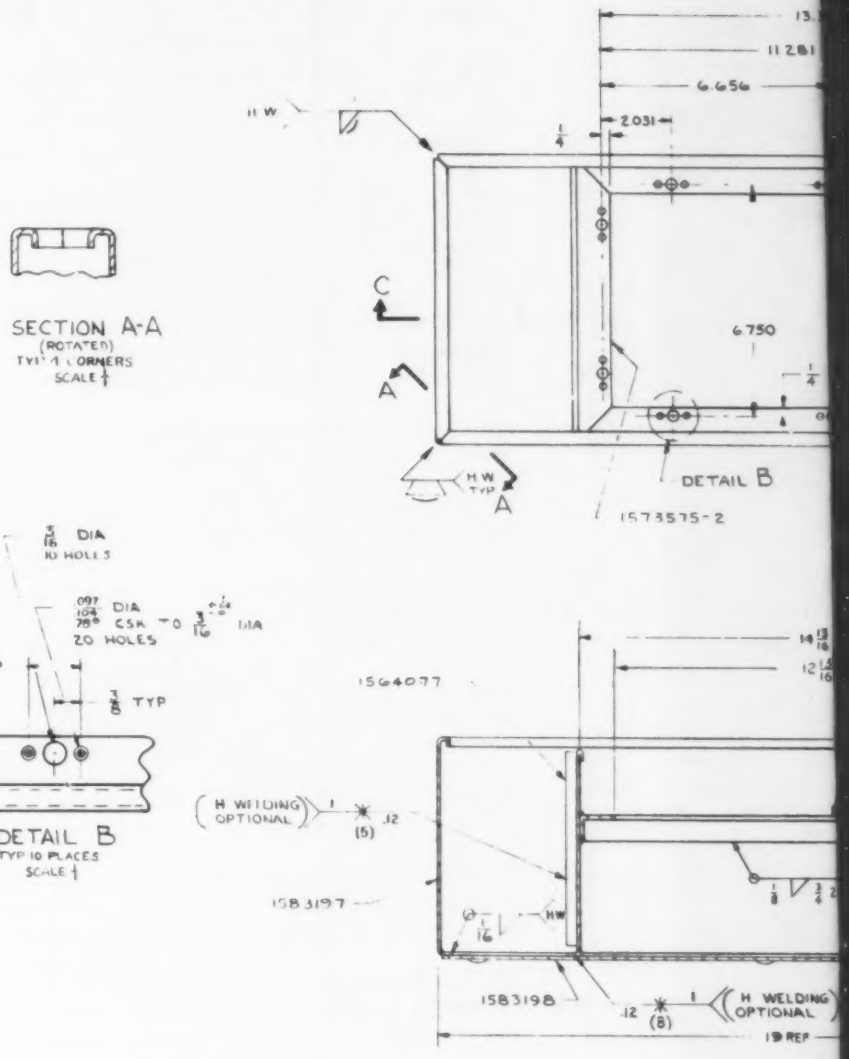
SECTION TWO - - - - - - - - LISTS APPLICABLE DOCUMENTS INVOKED BY SPECIFICATION INCLUDING: DRAWINGS; OTHER SPECIFICATIONS; GOVERNMENT AND COMMERCIAL STANDARDS; ETC.

SECTION THREE- - - - - - LISTS AND DEFINES REQUIREMENTS OF ITEM COVERED (AS APPLICABLE) INCLUDING: MATERIAL; DESIGN; PERFORMANCE AND PRODUCT CHARACTERISTICS; CONSTRUCTION; MEASUREMENTS, DIMENSIONS, WEIGHT, COLOR, FINISH, NAME PLATES OR MARKINGS; ETC.

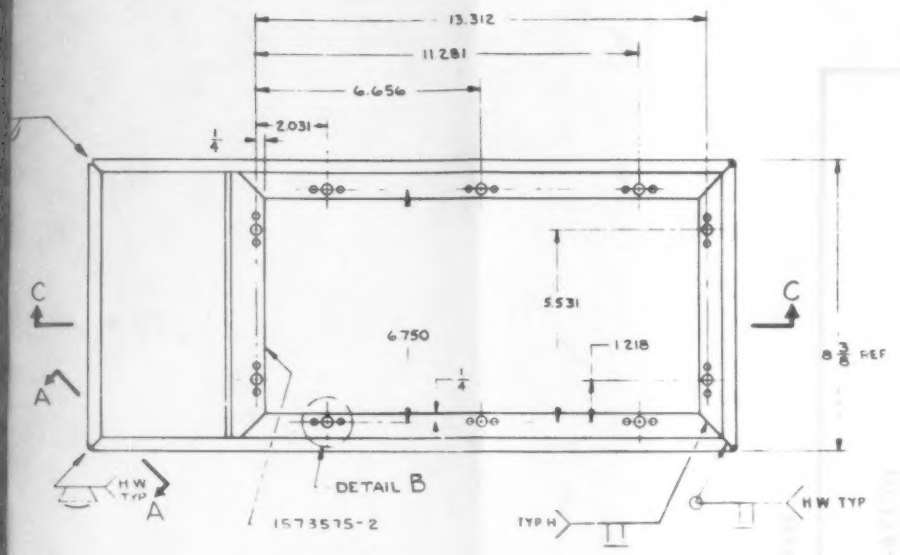
SECTION FOUR- - - - - - - SETS FORTH QUALITY ASSURANCE PROVISIONS AND TEST REQUIREMENTS INCLUDING: GENERAL PROVISIONS; TEST PROCEDURES; TEST METHODS; TYPE AND SCOPE OF TESTS; AND INSPECTION PROCEDURES.

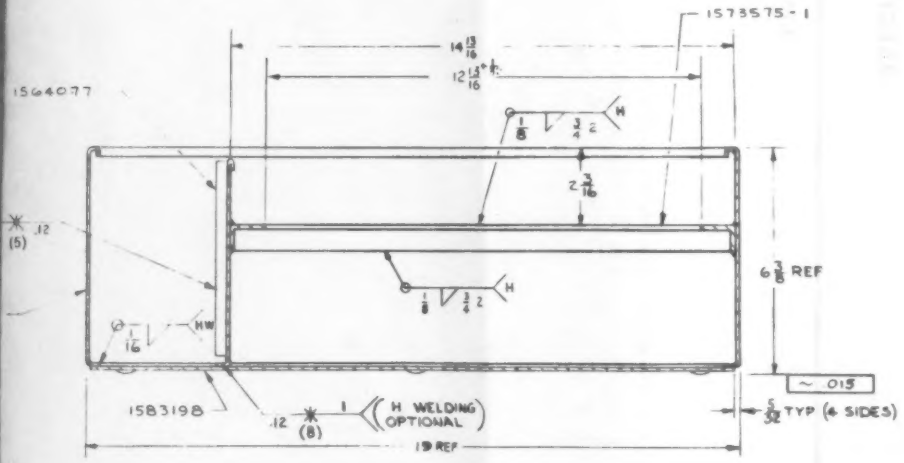
SECTION FIVE- - - - - - - SETS FORTH THE REQUIREMENTS FOR PREPARATION FOR DELIVERY INCLUDING: PRESERVATION AND PACKAGING; PACKING; AND MARKING.

SECTION SIX - - - - - - - - COVERS SPECIAL NOTES INCLUDING: INTENDED USE OF ITEM; ORDERING DATA; SAFETY REQUIREMENTS; PATENT NOTICE; CUSTODIANSHIP; ETC.


SECTION A-A
(ROTATED)
TYP 4 CORNERS
SCALE 1
11.281
6.656
2.031
6.750
DETAIL B
1573575-2
5/16 DIA
10 HOLES
.097 DIA
.104
.078
CSK TO 3/16 DIA
20 HOLES
3/4 TYP
3/8 TYP
DETAIL B
TYP 10 PLACES
SCALE 1
1564077
H WELDING OPTIONAL
(5)
.12
1583197
1583198
(8)
H WELDING OPTIONAL
19 REF
SECTION C-C

NOTE: UNLESS OTHERWISE SPECIFIED,
1. WELDING PER MIL-W-8604 & MIL-W-6858
2. WELDING SYMBOLS PER AWS-STD-10.
3. "W" INDICATES WATERTIGHT 1-1/2 P.S.I. EXTERNAL PRESSURE.
4. ANODIZE GRAY PER MIL-A-8625
5. DIMENSIONING AND TOLERANCING PER MIL-STD-8A.
6. "H" INDICATES HELIARC.





SECTION C-C

1583223	LD 482753	1	
NEXT ASSY	USED ON		
APPLICATION			

SEE NOTE

1/2

WELDMENT
(CASE)

1583199

Now, each military specification is identical in regard to number of sections; there are six. Each of these sections covers the same basic subject matter. So, if a contractor becomes familiar with one specification, he immediately is familiar with other specifications in regard to what to expect and where to find what he wants in any other specification.

Another way to look at a military specification is that it tells the contractor what to do with engineering terms, just as your Government contract tells the contractor what to do in business terms.

Going on to the sections of the specification, we find that section 1 always defines the scope, or purpose, of the specification.

Section 2 always lists the applicable documents invoked by the specification, including other drawings, specifications—such as the material specifications that I previously described—and Government and commercial standards. These are listed as references, so that we need not repeat the entire text of the reference within the specification and need merely reference the pertinent part of that reference in our particular product specification that we have here. Every document listed in section 2 is specifically invoked in the subsequent sections of the specification.

Going on to section 3, we always find the requirements of the item and, as applicable, these include the material to be used, design criteria, performance and product characteristics, construction notes, the measurements which refer to wattage, volts, amps, pressures, and so on, dimensions of the item, weight, color, finish, nameplates, markings, and other information.

Upon reading this section the contractor would know where to look for information that would control his production, he would know how the item operated and under what conditions, he would know the degree of operation expected of the item and so on.

Section 4 always sets forth the quality assurance provisions and test requirements of the item including a statement of the general requirements such as the size of sample lots, preproduction tests, and periodic tests during production; test procedures; test methods; type and scope of tests; and inspection procedures to be used both by the Government and the contractor. All tests listed support a requirement stated in section 3.

Section 5 always sets forth requirements for preparing the item for delivery, and includes preservation, packaging, packing, and marking of the item, and would be amplified by referring again to drawings to show the contractor how it was actually to be done.

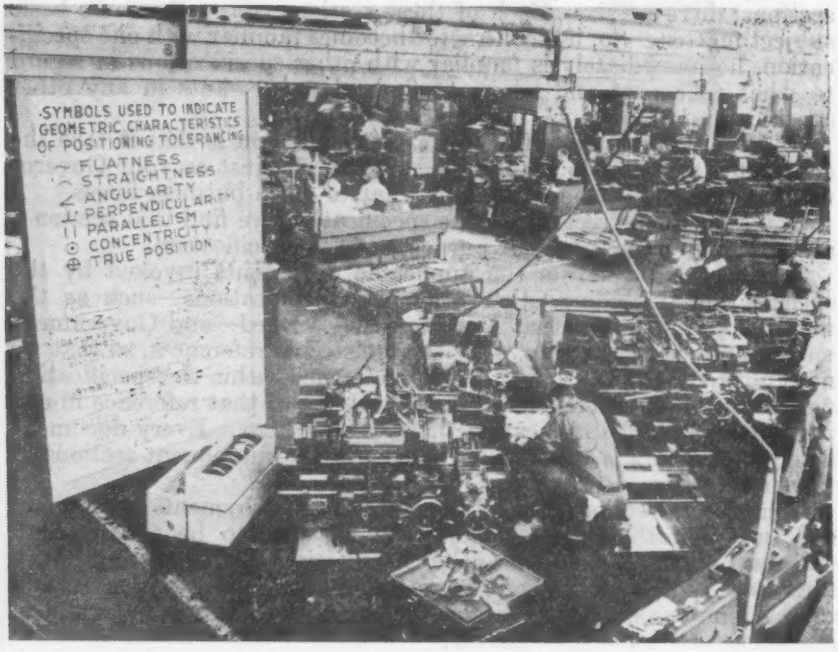
Section 6 covers special notes, including the intended use of the item, ordering data, safety requirements—if we have something that contains an explosive or has a loading process involved, we call out the safety requirements in here to caution the contractor.

It also includes patent notice, custodianship of material within the specification, and so on.

I would like to show you now a Bureau of Ordnance drawing received from one of our contractors. (See pl. IX.)

Now, the DOD itself sets up the format for the drawing and provides a title block down here [indicating] and a revision block up in the corner here. It provides a place for the contractor to put his flag in the title block, like "Vitro Corp."

PLATE X



It provides a place for the Government to sign off the drawing and authenticate it.

I want to call your attention up here to the notes where we have listed two military specifications on welding, a reference to a joint Army-Navy standard that covers welding symbols, another military specification that specifies how to anodize the surface for preservation after it has been welded, and also the reference to the military standard which covers the use of the dimensions and tolerances shown on this drawing.

This particular drawing shows how to weld a case designed to hold special test equipment for one of our ordnance items. These are welding symbols. This wedge, or triangle, indicates a fillet weld. The star is for a spot weld.

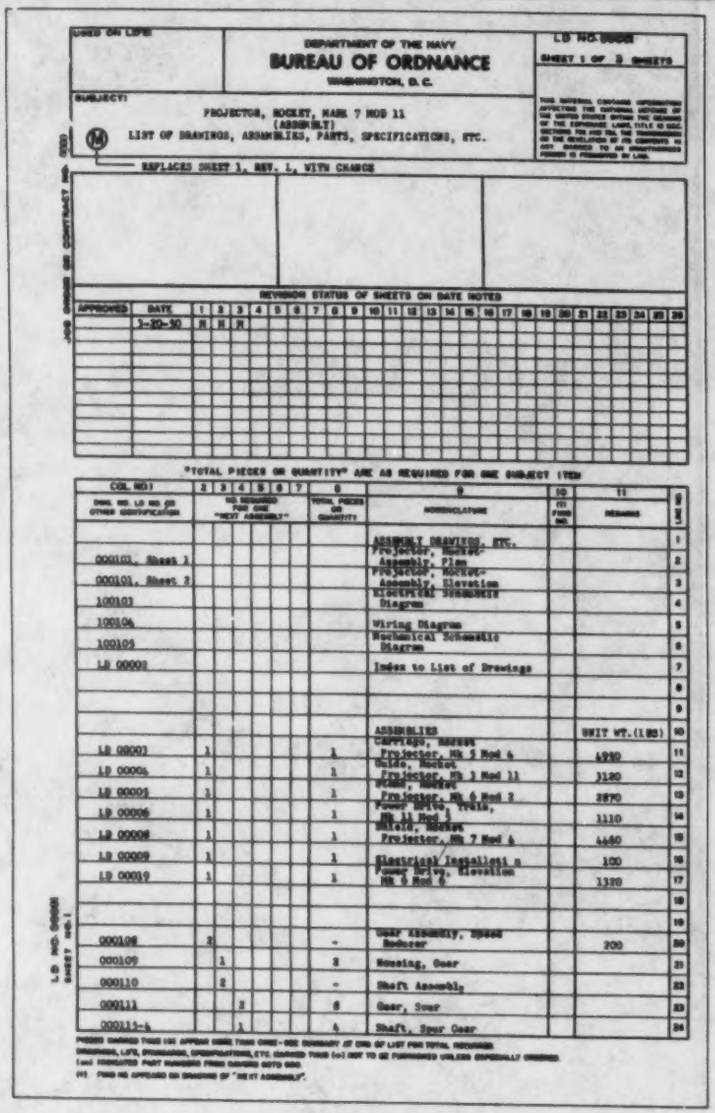
Let us read through an entire symbol. This one points to a shoulder to be welded in the case shown and indicates that the weld goes all around; that it is a fillet weld with a one-eighth-inch radius; that the length of each weld is three-quarters of an inch; that the distance between the centers of these three-quarter-inch welds is 2 inches; and that the heliarc welding process is to be used. The heliarc weld is a special form of arc welding.

To give you an example of how our contractors are actually using these standards, here is a photograph taken at the Northern Ordnance Plant in Minneapolis, Minn., where this contractor has posted large placards around his shop which show a summary of dimensioning standards to aid his machinists in reading drawings.

Therefore, any welder, once he becomes familiar with our basic Government standards, can look at this drawing and tell how to weld his pieces together and what welding technique to use.

96192 O - 57 (Face p. 2530)

LISTS OF DRAWINGS



DEPARTMENT OF THE NAVY
BUREAU OF ORDNANCE
WASHINGTON, D. C.

SUBJECT:
PROJECTOR, ROCKET, MARK 7 MOD 11 (ASSEMBLY)
LIST OF DRAWINGS, ASSEMBLIES, PARTS, SPECIFICATIONS, ETC.

LD NO. 00000
SHEET 1 OF 3 SHEETS

REPLACES SHEET 1, REV. 1, WITH CHANGE

REVISION STATUS OF SHEETS ON DATE NOTED

APPROVED	DATE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
	5-20-50	R	R	R																							

"TOTAL PIECES OR QUANTITY" ARE AS REQUIRED FOR ONE SUBJECT ITEM

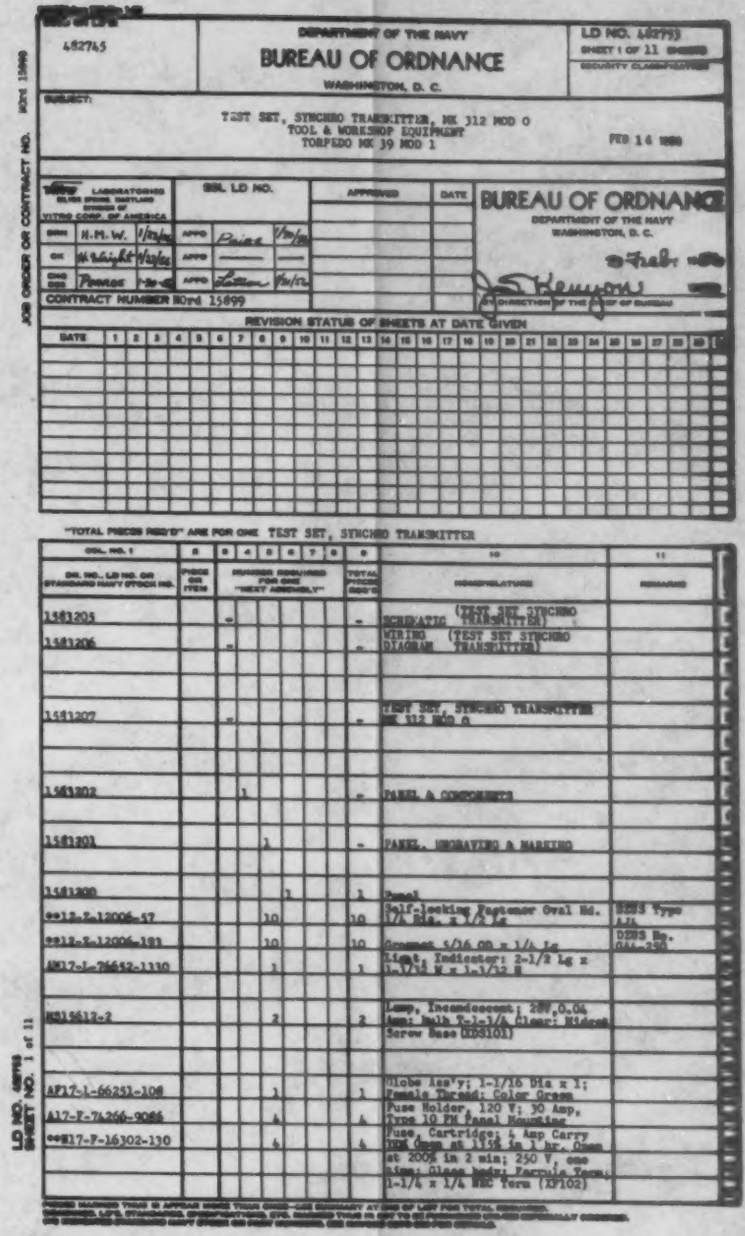
COL. NO.!	2	3	4	5	6	7	8	9	10	11	
DWG. NO. LD NO. OR OTHER IDENTIFICATION	NO. REQUIRED FOR ONE "NEXT ASSEMBLY"						TOTAL PIECES OR QUANTITY	NOMENCLATURE	ITEM NO.	REMARKS	SEQ. NO.
								ASSEMBLY DRAWINGS, ETC.			1
000101, Sheet 1								Projector, Rocket-Assembly, Plan			2
000101, Sheet 2								Projector, Rocket-Assembly, Elevation			3
100103								Electrical Schematic Diagram			4
100104								Wiring Diagram			5
100105								Mechanical Schematic Diagram			6
LD 00001								Index to List of Drawings			7
											8
											9
								ASSEMBLIES		UNIT WT.(LBS)	10
LD 00001	1						1	Carriage, Rocket Projector, Mk 7 Mod 4		4910	11
LD 00004	1						1	Guide, Rocket Projector, Mk 7 Mod 11		3180	12
LD 00005	1						1	Mount, Rocket Projector, Mk 4 Mod 2		2870	13
LD 00006	1						1	Power Drive, Train, Mk 11 Mod 1		1110	14
LD 00008	1						1	Shield, Blast Projector, Mk 7 Mod 4		4440	15
LD 00009	1						1	Electrical Installation		100	16
LD 00010	1						1	Power Drive, Elevation Mk 5 Mod 2		1320	17
											18
											19
000108	1						-	Gear Assembly, Speed Reducer		200	20
000109		1					1	Housing, Gear			21
000110		1					-	Shaft Assembly			22
000111			1				6	Gear, Spur			23
000113-4			1				4	Shaft, Spur Gear			24

LD NO. 00000 SHEET NO. 1

JOB ORDER OR CONTRACT NO. 0000

Figure 16-10. Sample LD, Title Sheet. Major Assembly (replacing LD of fig. 16–9).

All names, drawing numbers, and Mark and Mod designations are fictitious and do not represent actual equipment.



482745

DEPARTMENT OF THE NAVY
BUREAU OF ORDNANCE
WASHINGTON, D. C.

LD NO. 482793
SHEET 1 OF 11 SHEETS

SUBJECT:
TEST SET, SYNCHRO TRANSMITTER, MK 312 MOD 0
TOOL & WORKSHOP EQUIPMENT
TORPEDO MK 39 MOD 1

FEB 14 1950

	LABORATORIES	SBR. LD NO.	APPROVED	DATE
DRWN	H.M.W. 1/19/50	APPD Price	1/20/50	
CH	W.Wright 1/19/50	APPD ——	——	
ENGR SUP	Penney 1-20-50	APPD Latton	1/21/50	

CONTRACT NUMBER NOrd 15699

BUREAU OF ORDNANCE
DEPARTMENT OF THE NAVY
WASHINGTON, D. C.
By Direction of the Chief of Bureau

REVISION STATUS OF SHEETS AT DATE GIVEN

DATE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29

"TOTAL PIECES REQ'D" ARE FOR ONE TEST SET, SYNCHRO TRANSMITTER

COL. NO. !	2	3	4	5	6	7	8	9	10	11
DWG. NO., LD NO. OR STANDARD NAVY STOCK NO.	PIECE OR ITEM	NUMBER REQUIRED FOR ONE "NEXT ASSEMBLY"						TOTAL PIECES REQ'D	NOMENCLATURE	REMARKS
1581205		=						=	SCHEMATIC (TEST SET SYNCHRO TRANSMITTER)	
1581206		=						=	WIRING DIAGRAM (TEST SET SYNCHRO TRANSMITTER)	
1581207		=						=	TEST SET, SYNCHRO TRANSMITTER MK 312 Mod 0	
1581202			1					=	PANEL A COMPONENTS	
1581201				1				=	PANEL, ENGRAVING & MARKING	
1581200					1			1	Panel	
oo12-2-12006-57				10				10	Self-locking Fastener Oval Hd. 1/4 Dia. x 1/4 Lg	H283 Type A1A
oo12-2-12006-181				10				10	Grommet 5/16 OD x 1/4 Lg	D283 Eg. (AA-256)
AM17-1-76652-1110				1				1	Light, Indicator: 2-1/2 Lg x 1-1/4 W x 1-3/32 H	
MS15612-2				2				2	Lamp, Incandescent: 28V,0.04 Amp; Bulb T-1-1/4 Clear; Midget Screw Base (DD3101)	
AF17-1-66251-108				1				1	Globe Ass'y; 1-1/16 Dia x 1; Female Thread; Color Green	
A17-F-74266-9088				4				4	Fuse Holder, 120 V; 30 Amp, Type 10 FH Panel Mounting	
oo17-F-16302-130				4				4	Fuse, Cartridge; 4 Amp Carry 75% Open at 175% in 1 hr. Open at 200% in 2 min; 250 V, one time; Glass body; Ferrule Term; 1-1/4 x 1/4 REC Term (XP102)	

LD NO. 482793
SHEET NO. 1 of 11

96192 O - 57 (Face p. 2330)

Looking over here, we find a dimensioning symbol. This has a little wavy line, which is a flatness symbol, and indicates here to the right that this case sits on some little buttons. This flatness symbol would indicate that all these buttons must be within fifteen-thousandths of an inch from each other from a standard reference plane, so the case when it sits on a tabletop, it wouldn't teeter, or rock.

To give you an example of how our contractors are actually using our standards, here is a photograph (see pl. X) taken at the Northern Ordnance plant in Minneapolis, Minn. This contractor has posted some large placards around his shop which show a summary of dimensioning standards to aid his machinists in reading drawings.

You will find the same symbols, like the flatness symbol I just showed you. Here it is again, on here. This is taken from Military Standard publication 8A. Here we have flatness, straightness, angularity and so on, and machinists can check here for ready reference so they can read their own drawings at their particular machines.

I would like next to show you an example of our lists of drawings, or our table of contents of drawings, used to produce an item. (See pl. XI.)

On the left we have the standard form as shown in our manual for the preparation of list of drawings. On the right, we have a list of drawings actually received from one of our contractors.

To show how this is used, in the left hand column here we have either the Bureau of Ordnance drawing number or other approved Government number, such as a Government stock number.

Going over, we find a list of small columns. In these columns, you will be told how much of each item is required per assembly.

You will notice that some of the numbers are further to the right than others.

It is in outline form, in that for this panel all these items down here make up one panel. And likewise, if you go down, you will see that this is subordinate to this, so that this is included in this. It gives you the relationships of the various pieces shown on the list of drawings and how they fit together in the overall item.

Going over further, we find the actual title of the item. This again, would be the same title as you would find on the title block on the drawing itself.

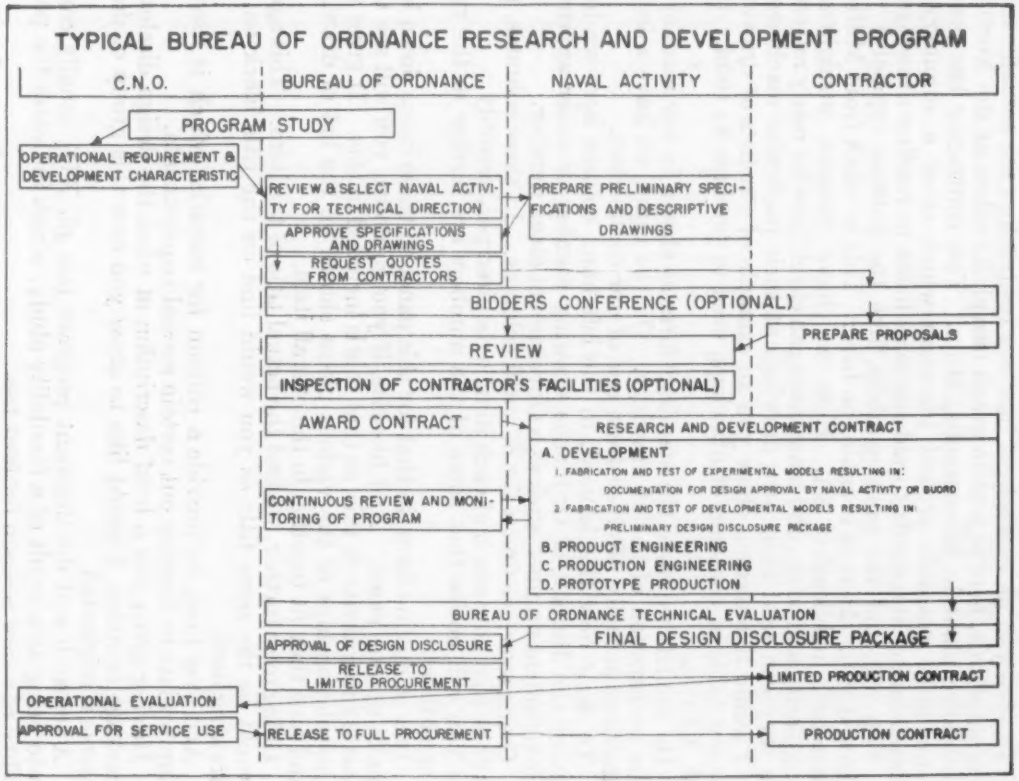
And over here, we provide a column for remarks, which is used as appropriate in flagging out certain special requirements.

Having given you a brief description of what the design disclosure package contains, I would like to show you how this group of documents is originated.

A research and development program (see pl. XII) usually comes into being as a result of a feasibility study, which indicates the possibility of a new weapon for fleet use.

If the Chief of Naval Operations desires work to be continued on the weapon proposed in the completed study, he will then tell the Bureau of Ordnance to undertake a weapon development program through an operational requirement, and a supporting development characteristic.

PLATE XII


TYPICAL BUREAU OF ORDNANCE RESEARCH AND DEVELOPMENT PROGRAM
C.N.O.
BUREAU OF ORDNANCE
NAVAL ACTIVITY
CONTRACTOR
PROGRAM STUDY
OPERATIONAL REQUIREMENT & DEVELOPMENT CHARACTERISTIC
REVIEW & SELECT NAVAL ACTIVITY FOR TECHNICAL DIRECTION
PREPARE PRELIMINARY SPECIFICATIONS AND DESCRIPTIVE DRAWINGS
APPROVE SPECIFICATIONS AND DRAWINGS
REQUEST QUOTES FROM CONTRACTORS
BIDDERS CONFERENCE (OPTIONAL)
PREPARE PROPOSALS
REVIEW
INSPECTION OF CONTRACTOR'S FACILITIES (OPTIONAL)
AWARD CONTRACT
RESEARCH AND DEVELOPMENT CONTRACT
A. DEVELOPMENT
1. FABRICATION AND TEST OF EXPERIMENTAL MODELS RESULTING IN:
DOCUMENTATION FOR DESIGN APPROVAL BY NAVAL ACTIVITY OR BUORD
2. FABRICATION AND TEST OF DEVELOPMENTAL MODELS RESULTING IN:
PRELIMINARY DESIGN DISCLOSURE PACKAGE
B. PRODUCT ENGINEERING
C. PRODUCTION ENGINEERING
D. PROTOTYPE PRODUCTION
CONTINUOUS REVIEW AND MONITORING OF PROGRAM
BUREAU OF ORDNANCE TECHNICAL EVALUATION
APPROVAL OF DESIGN DISCLOSURE
FINAL DESIGN DISCLOSURE PACKAGE
RELEASE TO LIMITED PROCUREMENT
LIMITED PRODUCTION CONTRACT
OPERATIONAL EVALUATION
APPROVAL FOR SERVICE USE
RELEASE TO FULL PROCUREMENT
PRODUCTION CONTRACT

A design activity, or a design contractor, is selected by the Bureau, who prepares preliminary specifications which give you the general basic scope of what we want—these are not firm details, but they indicate the design parameters we are looking for, and make up some outline drawings to depict visually what we are shooting for.

These are brought back to the Bureau for approval. Along with the request for quotations from contractors, we send these out to several contractors. Usually, we have a bidders' conference, especially if the item is at all complex.

One of the tools we found very useful in a bidders' conference is the use of the component breakdown chart, or what we call in the Bureau a "Christmas tree." (See pl. XIII.)

To illustrate how such a chart works, I have selected as my weapon sample, a torpedo.

Now, the parts of a torpedo are namely a warhead, battery compartment, afterbody assembly, and tail. We show here an exercise head, which replaces the warhead for fleet training purposes.

Now, taking this as our basic example, let's see how this chart breaks down this picture for us.

Here, we find the torpedo and associated equipment. Coming down to the first breakdown line, we find the torpedo proper, the exercise section, which is only a peacetime use item, and the associated equipment, such as shipping, containers, test equipment, shop equipment, repair parts, and so on.

Now, breaking down each one of these into the subassemblies, we find the torpedo breaks down into warhead, the main assembly, and the battery.

Now, breaking down the main assembly, we find we have a battery compartment, an afterbody assembly, and a tail. And again, breaking down the afterbody assembly, we see this breaks down into a high voltage power supply, a shell, a motor, a steering gyro, and a depth-control mechanism. These are all located within this afterbody assembly.

Therefore, by using this chart we can very quickly give a contractor a picture of what we have in mind, the level of assembly for each item described—where it fits into the picture, and in a very short time we are able to get him on board with a good basic foundation of what we are talking about.

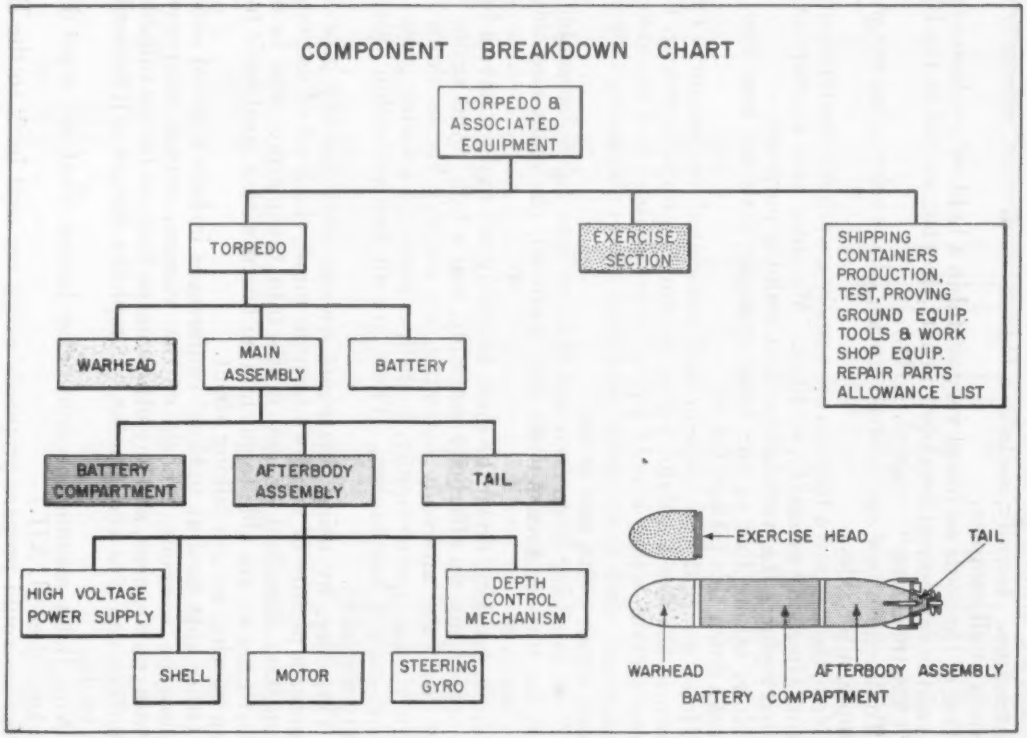
Other aids used at bidders' conferences include films of similar or prototype weapons, models of the weapon, actual components of prototype weapons, and any other means that we have available with which we can give a contractor as complete a picture as it is possible for us to do.

Now, let's assume the contractor knows what we want him to make. (See pl. XII.)

So he would prepare proposals which are sent back to the Bureau for review.

At the same time, if we were not familiar with his facilities, that is the size of his plant, his research and development facilities and such, we would conduct a plant inspection tour. Upon a review of his facilities along with his proposal, we would award a contract to one of the contractors, who in turn would commence the development program.

PLATE XIII


COMPONENT BREAKDOWN CHART
TORPEDO & ASSOCIATED EQUIPMENT
TORPEDO
EXERCISE SECTION
SHIPPING CONTAINERS PRODUCTION, TEST, PROVING GROUND EQUIP. TOOLS & WORK SHOP EQUIP. REPAIR PARTS ALLOWANCE LIST
WARHEAD
MAIN ASSEMBLY
BATTERY
BATTERY COMPARTMENT
AFTERBODY ASSEMBLY
TAIL
HIGH VOLTAGE POWER SUPPLY
DEPTH CONTROL MECHANISM
SHELL
MOTOR
STEERING GYRO
EXERCISE HEAD
TAIL
WARHEAD
BATTERY COMPAPTMENT
AFTERBODY ASSEMBLY

Now, he in turn would fabricate test and experimental models, which would ultimately lead to a development model, which would be of a firmed-up design.

When that model comes into existence, we see the first sign of our disclosure package coming in as an entity itself.

Developing the item further and by introducing product and production engineering into the design of the weapon, we come up with a production prototype weapon which we earmark for our Bureau of Ordnance technical evaluation.

The purpose of this evaluation is to prove out the performance requirements of the weapon as required by the Chief of Naval Operations.

This is a technical requirement. We are not overly concerned about the tactical use here. Upon the completion of the technical evaluation—and we crank in the necessary engineering changes that are brought out as being required—we then have our final design disclosure package.

Now, this in turn is approved and after it is approved we release same for a limited production or what we call a pilot production run, which produces models to be used over here in the operational evaluation conducted by the Chief of Naval Operations.

This pilot production run also does another thing for us. It tests our production tooling in that the tooling used in our pilot production run is the same tooling that will be used later on in producing the item in quantity for fleet use.

So we not only produce hardware for our CNO operational evaluation, but we also run a tooling test in our manufacturers' shop.

Assuming that we have a successful operational evaluation and the weapon is approved for service use, it is then released for full procurement, and a production contract will follow.

Whether the production contract immediately follows a research and development program as just described or comes about as the second, third, or subsequent procurement of an ordnance item already in fleet use, the sequence of events depicted on this flow chart (see pl. XIV) will generally apply.

If we had just finished our development program, we would have obtained our design disclosure package for our development contractor, who might be also our first producer, as has been the case in some of our accelerated high priority guided missile programs.

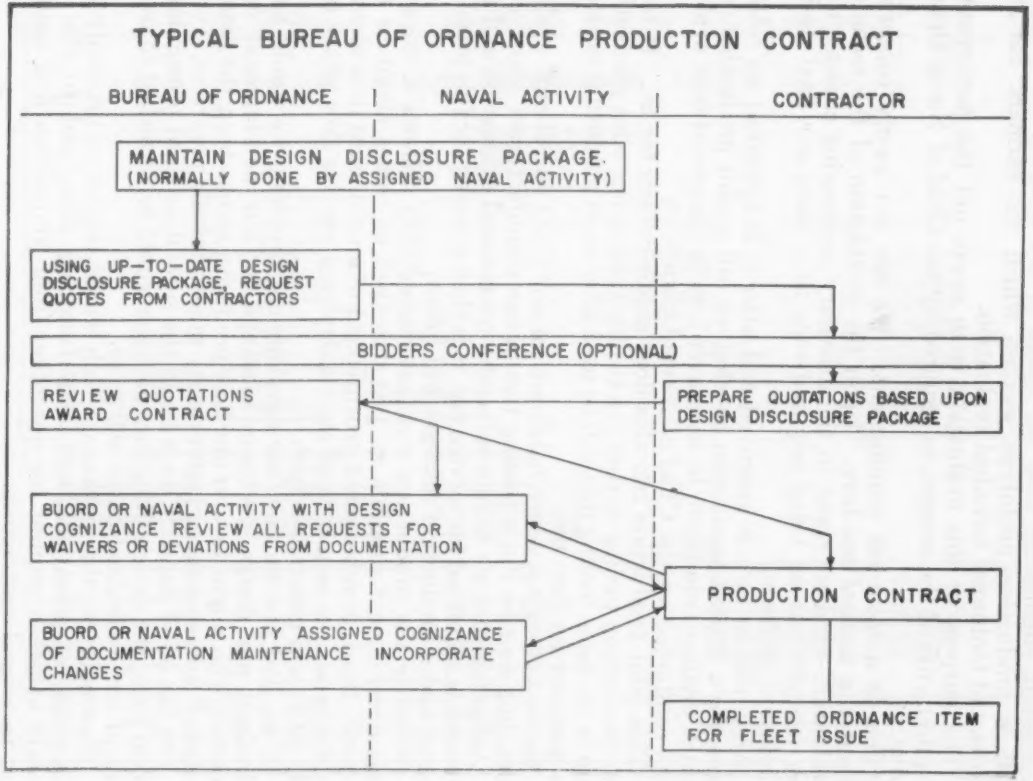
On the other hand, if we were in the second or third procurement of an item, the design disclosure package would be furnished to us by one of our designated naval activities.

We would get this package, which would consist of primarily the drawings, specifications, and manufacturing data, and to this we would attach a request for quotation from contractors and send it out to several contractors.

Normally, unless we have a very simple item for manufacture, we would have a bidders' conference, where again we would go through and give him a lot of amplifying information, show him actual hardware built, and so on, so he gets a good picture of what he has to do.

Then he would prepare quotations based on the design disclosure package and the information that he got here at his bidders' conference. He would send his quotation into the Bureau for review.

PLATE XIV


TYPICAL BUREAU OF ORDNANCE PRODUCTION CONTRACT
BUREAU OF ORDNANCE
NAVAL ACTIVITY
CONTRACTOR
MAINTAIN DESIGN DISCLOSURE PACKAGE (NORMALLY DONE BY ASSIGNED NAVAL ACTIVITY)
USING UP-TO-DATE DESIGN DISCLOSURE PACKAGE, REQUEST QUOTES FROM CONTRACTORS
BIDDERS CONFERENCE (OPTIONAL)
REVIEW QUOTATIONS AWARD CONTRACT
PREPARE QUOTATIONS BASED UPON DESIGN DISCLOSURE PACKAGE
BUORD OR NAVAL ACTIVITY WITH DESIGN COGNIZANCE REVIEW ALL REQUESTS FOR WAIVERS OR DEVIATIONS FROM DOCUMENTATION
PRODUCTION CONTRACT
BUORD OR NAVAL ACTIVITY ASSIGNED COGNIZANCE OF DOCUMENTATION MAINTENANCE INCORPORATE CHANGES
COMPLETED ORDNANCE ITEM FOR FLEET ISSUE

If we were not familiar with this contractor's plant we would go out and take a look at it to know who we were buying from, and what his capacity actually was.

Once the quotations are received and we have an idea of what he can do by actually seeing his facilities, we will go ahead and award a contract to the lowest bidder.

The contractor now having tooled up, starts his production. Communication lines are set up to provide the contractor with a rapid means of processing waivers and deviations from the documentation which may come up during his production run.

Likewise, a revolving communication loop is set up between our naval activity assigned cognizance for maintaining these documents, and the contractor to incorporate changes as are required and found necessary in this production contract.

Therefore, when we get through with our production contracts, we not only get a completed ordnance item for complete issue, but we also get our design disclosure package back in an up-to-date and corrected form.

I can't emphasize too strongly that the most important aspect in the area of instruction and in the preparation and use of documents is that of communications.

That is, seeing the contractor has received the information and knows how to use it. While the Bureau of Ordnance uses documentation as its primary means of communication with its contractors, such a system must be supported by able administration and good organization.

It is continuously borne in mind that before any program can be initiated, whether for research and development, production or both, considerable staff work must be accomplished.

This includes budget planning, orderly scheduling of work to be undertaken, and the integrated procurement of new and current weapons to meet fleet needs.

Additional staff work is also required after programs have been started, which include program planning, liaison work with other bureaus and departments, continuous review and adjustment of bureau policies and directives to meet the needs of contractors, naval activities, and other organizations that look to the Bureau for direction, and the approval, or disapproval, of design changes to ordnance equipment.

We are fortunate in having high caliber personnel available who can perform these duties and the Bureau fully realizes the importance of retaining such personnel.

The Bureau is organized so as to provide many forms of both direct and indirect aids to contractors. For example, we have on an always available basis, a contract specialist whom contractors can contact for the purpose of introducing themselves to the Bureau. This specialist informs the contractor of the type and the amount of information the Bureau desires in respect to his experience, his personnel, and his field of interest in regards to ordnance work.

On receiving this information from contractors, this specialist disseminates this information to the technical personnel in the Bureau for consideration in future Bureau of Ordnance programs.

Another example in the area of contractual relationships, which is appreciated by our contractors, is the Bureau's policy of assigning a specific contract negotiator to each contract.

This concept of operation greatly facilities contractual amendments and in contract administration in general.

Still another manner in which the Bureau assists its contractors is its "open door policy." Any time one of our contractors has a problem and desires amplification or explanation of a point in question or just desires to discuss his problems in general, he is always welcome to come into the Bureau. As necessary, experts in the fields of research and development, procurement, production engineering, contracts, inspection procedures, documentation, and other fields of interest are readily available from an in-the-Bureau organization for such discussions, with the result that in many cases, the contractor presents his problem and gets his answer immediately.

In the category of an indirect aid to contractors is a problem of considerable magnitude. That is, maintaining our documents in up-to-date status once they have been released to production.

This is the most unglamorous, but probably one of the most important roles in documentation because an out-of-date drawing, for example, is worthless. All the time and effort taken to make the drawing—that is, the research and development time required to turn out the item depicted by the drawing—is lost, unless the drawing is kept up to date.

In fact, the success of our documentation concept hinges on our ability to have these documents in an up-to-date, ready-to-issue form at all times.

Accordingly, the Bureau of Ordnance has designated certain of its activities to perform just this type of work. The Central Torpedo Office, located at Newport, R. I., and Naval Gun Factory located here in Washington, are two such activities.

The success of a contractor in being able to produce quality ordnance items, in addition to his own abilities, is largely dependent on the producibility of the item as reflected by the documents he has to use in his production.

In this respect, the Bureau has conducted producibility reviews by production engineers, sometimes by a separate engineering group, to insure that our documents clearly set forth what has to be made in terms readily understood by manufacturers and that the items lend themselves to being produced in manufacturers' shops.

The results of these reviews have been highly successful. Our pilot production run, that I described to you as being a limited production run, is another way in which we verify producibility.

Still another manner in which we are inserting production thinking into our ordnance programs is by having the design and production engineers work together as a team, right from the start of the program. This introduces production thinking at the inception of our programs.

All the methods described to improve producibility have been very effective in reducing the number of proprietary items used in ordnance work.

The proprietary items are those parts that can be made only by a certain manufacturer because he either controls the rights to make it or, more seriously, because he is the only one that can make it.

I would like to point out, too, that a producibility review does not necessarily mean to design for mass production where considerable use of automation is often made. Economy of manufacture is a

constant consideration, but one must consider the cost of tooling versus the total number of units to be made in order to determine which is the lowest overall cost involved.

For example, on our large, complex guided missiles where the total number to be produced is limited, the writeoff on automation tooling would almost double the cost of the missile itself.

The documentation programs and examples dealing with contractors, which I have described to you, are the constant goals of the Bureau of Ordnance. I am very happy to be able to say that we have been increasingly successful in meeting these goals in quite a few of our programs. However, we would be the first to admit that we have many areas in which progress can and must be made.

Therefore, if you were to scan the programs being undertaken by the Bureau of Ordnance you would find variances and deviations in what has been described to you this morning. Some, we feel, are at variance for justifiable reasons. Others may be deficient due to extenuating circumstances, and in some cases, we have just fallen short.

For example, it would be illogical to spend any money on a producibility review of an item if only 2 or 3 are ever to be produced.

The same would hold true if we were making an interim model in a limited production run to fill a gap for fleet needs. Here the cost of the producibility review would never be underwritten by the length of production we had in mind.

Another example of where documents were incomplete is the case where the only models built were of an experimental nature, with no quantity production in mind whatsoever, and subsequently the item becomes a "best seller" in the fleet.

Time itself has been a factor where the fleet requirements schedule has precluded our doing the type of job we wanted to do.

Good documentation costs money, but it is money well spent when you consider the advantage it provides in giving you flexibility of operations, expansion potential, uniformity, dependability, and so on.

When you consider and include the cost of product and production engineering plus the direct costs of preparing specifications, drawings, manuals, and other documents, approximately 40 cents of every development dollar spent goes to documentation. In other words, considerable engineering effort precedes the preparation of final drawings and other documents to provide for flexibility in procurement actions. If this engineering effort is not provided, equipment procurement may be limited to a single source.

In conclusion, I would like to list the following precepts which are the basis of operation at the Bureau of Ordnance.

First, the end product of all research and development programs which result in new weapons for the fleet is the design disclosure package.

Second, one of the best methods to ensure that documentation is usable by all contractors is to have it consistently and in the same format and language, which can be accomplished through standardization.

Third, the success of a contractor to produce a quality end product will vary directly with the degree and effectiveness of the producibility of the item.

Fourth, to be an effective tool for the procurement of ordnance material for the fleet, the design disclosure package must be kept up to date.

Fifth, the better our communication lines are established and maintained with the contractor, the better the performance of the contractor.

And sixth, continuous attention must be given to the problems confronting the contractor, which are the best indicators as to our success in how well we have supplied him with adequate information in order for him to do his job.

We, of the Bureau of Ordnance, are constantly striving to meet these goals. The attainment of these goals will enable us to fulfill our mission of supporting the fleet by being able to rapidly expand our production of ordnance material in the event of a national emergency.

Accordingly, we are continually looking for better methods, new ideas, and any other way we can enhance our program.

Mr. HÉBERT. Thank you very much, Commander.

You have some questions?

Mr. COURTNEY. [Aside.]

Mr. HÉBERT. Any questions, General Devereux?

Mr. DEVEREUX. I think maybe this would properly be addressed to the admiral.

What is the history behind your standardization program?

Admiral QUINN. Essentially, General, it is an evolution. We found during the war, World War II, many producers who were interested but didn't have the capability.

I think I would be fair to all who assisted us during the war in saying that from them we gained ideas of what they needed, and then following V–J Day we consolidated—and this design disclosure package has evolved. It is still in the process of being improved. We are very proud of our relationship with our producers. We have their confidence, and we hope they are confident that we will give them the information as it is current.

Mr. DEVEREUX. Did you have any trouble in getting industry to accept your methods and procedures and design and so on in this common package?

Admiral QUINN. On the contrary, we have every indication that they are pleased with it.

Perhaps, one of the operators, like Commander Bunting, could cite some instances of the recent past in which bona fide producers have given expressions of their approval.

Commander BUNTING. Well, there is——

Admiral QUINN. Do you have any particular examples?

Commander BUNTING. I can give a couple I can think of offhand.

Librascope, Inc., of General Precision Equipment Corp. are responsible for the standards in that larger corporation, and it is reported that they have adopted, more or less, our package here from being one of our contractors on one of our ordnance programs, for corporation standards in regard to preparing drawing and specifications.

Just yesterday, the chief draftsman of Bendix Pacific was in my office, and he made the statement that BuOrd drawings made sense, were logical, were easy to prepare, and they were complete. So I think we have industry gradually coming over.

We don't say they are coming over in flocks, but it is a continual process and they are coming over.

Mr. DEVEREUX. Do you find that throughout the industry they are able to understand the Bureau of Ordnance specifications and so on without any difficulty?

Admiral QUINN. I have no examples where a producer has indicated a misunderstanding or lack of that.

But I have some of my assistants who are closer to this. Mr. Jones, you are in the office where contracts are signed. Have you any indication that we should be clearer?

Mr. COURTNEY. This is Mr. M. E. Jones, of the Contract Division.

Mr. JONES. I might say that when the design package is disclosed completely, there is no difficulty. The problem area is primarily where the package has not been completely disclosed.

Mr. COURTNEY. I have understood in the electronics field that some of the larger manufacturers or producers are very reluctant to reduce their information to a standardized form so that competitors might bid against them.

Admiral QUINN. That is probably a tendency. But in dealing with the Bureau of Ordnance, from the outset they are given to understand that we expect them to cooperate with us as we cooperate with them.

And when the Government pays them for an item that is going to be produced, a part of that pay goes toward the documentation. I believe Commander Bunting mentioned 40 cents out of each dollar.

Mr. COURTNEY. Forty cents.

Admiral QUINN. Can be attributed to the documentation.

Mr. DEVEREUX. How much of this standardization has been placed upon you by the Defense Department?

Commander BUNTING. A lot of it.

Admiral QUINN. It has been the concept of the Defense Department to give the broad outlines and then it is up to the initiative of the activities like the Bureau of Ordnance to implement those guidelines clearly and effectively to our producers.

They have in the Defense Department indicated the desirability and the broad outlines but have excluded details.

Mr. DEVEREUX. Well, how about with Army Ordnance?

Do you all work together on this?

Do you have standard symbols, and can you present—I mean does the Army Ordnance have an opportunity to use whatever you have?

Admiral QUINN. They are generally familiar with what we have.

We work very closely with Army Ordnance on many items—ammunition, explosives, and items such as fuzes and cartridge cases.

I am not familiar with the extent to which they use our design disclosure package concept. I am quite sure they don't refer to the information they turn over to a producer in the same terminology we do. But it is my observation that something approximating this is attempted by Army Ordnance and we have many exchanges, almost weekly, with them on details.

Mr. DEVEREUX. Well, maybe I ought to put this a little differently. Suppose a bidder, a producer, would take from the Bureau of Ordnance of the Navy your package and had been producing. Could he then go to take a bid on an Army project and understand it very thoroughly without being indoctrinated in the Army's procedures?

Admiral QUINN. I don't believe he would understand it immediately, but he would have the introduction to what the Army would want.

Now, from our Chief Engineer's Office we have with us Mr. Burk, who I believe, can expand on that concept.

Mr. HÉBERT. Will you please step forward, Mr. Burk.

Mr. COURTNEY. Come forward, Mr. Burk, and have a chair.

Admiral QUINN. General Devereux is wondering: if one of our producers who was completely familiar with the design disclosure package of one of our items, either through actual production or through study of it, is approached by the Army Ordnance and the Army Ordnance representatives says to this contractor, "I understand you have been or are about to produce these items for the Bureau of Ordnance. We have a similar item. Would you consider producing for us?"

At that point, does the Army have something that approximates our design disclosure package?

You think the producer would be at a loss as to what the Army would like for him to do?

Mr. BURK. No, sir.

I believe we have actually between the Army Ordnance and Navy Ordnance very similar drawing and specification practices. They have used some of our design disclosure packages and we have used theirs, with very little difficulty.

Basically, we both use the military standards.

So that forms a common basis for a very large percentage of the means of understanding of drawings and specifications. Then where we have had to augment those standards and specifications, in past years, we have worked together efficiently.

We probably worked more with Army Ordnance than anyone else.

So there is a great similarity in what we do. We actually, during the war, that is the Bureau of Ordnance, built 40-millimeter single mounts from Army Ordnance drawings.

Mr. DEVEREUX. Well, if a contractor was completely familiar with the Bureau of Ordnance development—what is the package called?

Commander BUNTING. Design disclosure package.

Mr. DEVEREUX. Could he then immediately take over something similar to that from Army and go into—have a complete understanding of it, or would he have to have a special staff who are familiar with the Army's procedures.

Admiral QUINN. I would like for Mr. Tann to describe what he considers the answer to that question, General Devereux.

Mr. Tann is perhaps more familiar than any other individual in our Bureau, in dealing with contractors who deal with Army Ordnance and the Navy.

Mr. TANN. General, I think I can answer your question.

During World War II, we had a facility run by a contractor in Detroit, Mich., Clayton & Lambert Co., who produced a total of 42 million 40-millimeter steel cartridge cases.

At the end of the war and very shortly before Korea, it was decided by the Chief of Army Ordnance and the then Chief of the Navy Bureau of Ordnance, Admiral Noble, that it would be to the advantage of both services if he had a joint Army and Navy steel cartridge case plant, which could make steel cartridge cases—40 millimeter for the Army, 3-inch 50's for ourselves, 75 and 76 millimeters for the Army,

90 millimeter for the Army, 3-inch—I mentioned 3-inch 50, 3-inch 70 for ourselves, and 5-inch 38 and 5-inch 54, all various caliber, as you will notice, and they are both Army and Navy. This joint Army and Navy steel cartridge case plant was built after a selection board had selected the most suitable site for it. It happened to be within the confines of the Government reservation at the naval ordnance plant in Louisville, Ky. Clayton & Lambert ran that plant during Korea and are running it today, making both Army and Navy cases from Army drawings and from Navy drawings, and the drawings are very similar. Because as Mr. Burk pointed out, they are made in accordance with the military standards for drawings, with such data, specifications, and so forth being common to both services.

The same thing is true of another joint Army and Navy venture: The steel extruded projectile plant at Pittsburgh, which is another joint Army-Navy venture. We have made 105-millimeter projectiles there. We have made 3-inch 50-caliber for ourselves, and 5-inch 30 for ourselves. We do work together, and it is understandable.

The design disclosure package is understandable, with respect to those very large and high rate of production items.

It is understandable and intelligible to both services and to the contractor.

Mr. DEVEREUX. Of course, you are giving an example of something that is rather simple, are you not?

I mean, if you got into something that was quite complicated, do you think a manufacturer would have to have a special staff to be able to understand Army ordnance as well as another staff to understand naval ordnance?

Mr. TANN. Well, General, I do not think so. If the item was one that was described by drawings made to present military standards, he should have no difficulty.

Mr. DEVEREUX. Yes.

Mr. TANN. It was a fairly recent item—and I know one that is in development now. I mean one that has been in development since 1948. I don't believe there would be any difficulty.

There hasn't been to my knowledge, sir.

Admiral QUINN. I am sure they would not have any difficulty interpreting the part of the Navy's design disclosure package in relationship to its application to the item the Army ordnance would want to do.

There would be great coordination and constant reference between those two major activities, Army Ordnance and Navy Bureau of Ordnance, I am sure, sir.

Mr. DEVEREUX. Mr. Chairman, since I asked for this hearing, I wonder if the committee understand just exactly what we are trying to develop.

Now, the reason as I understand it that the Bureau of Ordnance was selected to make this initial presentation was because they have done a very fine job on getting down to standardization.

And I am delighted to hear that the information and so on is interchangeable with the Army Ordnance.

Now, with that sort of background, I hope the committee will take time to hear in another area where I believe we will find there is no standardization whatsoever between two of the Departments in the Department of Defense.

Mr. HÉBERT. Well, I think the committee understands that, General.

Specifically, while we have the Navy—we hope to have the Army. I understand the greatest difficulty—and I would like your comment on this—is with the Air Force.

Mr. DEVEREUX. Yes.

Mr. HÉBERT. Is that correct?

Mr. DEVEREUX. Yes, sir.

Mr. HÉBERT. Naturally, we will have the Air Force in to find out what exactly they have done or are doing.

Mr. DEVEREUX. And what they haven't done.

Mr. HÉBERT. And what they haven't done.

Mr. DEVEREUX. Between not only—the Navy and the Air Force is where I think the problem has to be attacked first, because I am informed reliably in 1 of our aircraft manufacturing plants that they have to have 2 staffs, 1 to be able to understand what the Air Force wants, and another staff to be able to understand what the Navy wants, in the production of aircraft.

Mr. HÉBERT. Admiral, can you comment on your association with the Air Force?

Admiral QUINN. Well, as you know, sir, the Air Force procures ammunition from both Army Ordnance and Navy Bureau of Ordnance.

Insofar as the Bureau of Ordnance is concerned, our relationship with the Air Force is of the very highest order—good, effective, clear, with liaison on a personal and semiofficial basis going on, in the same way it does with Army Ordnance, on a smaller scope of course because we don't have as many items in common.

Mr. HÉBERT. General, may I suggest you can direct a specific question to the Admiral, and let's find out exactly what you have in mind.

Mr. DEVEREUX. Well, the thing—I am not talking about Ordnance so far as the relationship between the Bureau of Ordnance of the Navy and the Air Force. My remarks were directed to the production of aircraft.

Mr. HÉBERT. That would come under the Bureau of Aeronautics of the Navy.

Mr. DEVEREUX. That would come under the Bureau of Aeronautics and not the Bureau of Ordnance.

Admiral QUINN. I would not feel myself competent to address myself to that relationship, but I am sure Admiral Russell, Chief of the Bureau of Aeronautics, could give us the status on that.

Personally, I can't say, sir. I am sorry.

Mr. DEVEREUX. I didn't think so.

Mr. Chairman, I am through.

Mr. HEBERT. Are you finished?

Mr. DEVEREUX. Yes, sir.

Mr. HESS. I would like to ask the Admiral or the Commander one question, Mr. Chairman.

In connection with these symbols that you showed on the chart there—I recall 1 chart that was hanging in the plant of 1 of your contractors, where they had a large picture of these symbols telling what they meant. Has that been standardized for all of the services by the Department of Defense?

Commander BUNTING. Yes, sir.

Those are taken from the military standard publications put out by the Department of Defense.

Mr. HESS. Why is there any reason at all that a contractor who might either receive a contract from the Air Force, from the Army, or from the Navy, could not understand those symbols? He could; couldn't he?

Commander BUNTING. I don't know.

If he used that manual, he could, yes, sir.

Mr. DEVEREUX. That is for the production of Ordnance.

Mr. HESS. Ordnance, yes.

Commander BUNTING. That is for all to use, sir.

That is a DOD publication. It is not just for Bureau of Ordnance use.

Mr. COURTNEY. Well, may I break in there?

Specifically, Commander—now, let me get away from the symbols that were on the board, and take the convention that you showed for a type of weld, which was on the same chart.

Would that be interchangeable between services?

Commander BUNTING. Yes, sir.

Those are specifications, what they call coordinated specifications, which are coordinated with the other services.

A welding specification, for example, would describe a fillet weld or a butt weld or other types of arc welding. It would define spot welding. It would define what had to be done to the material before you welded it, how it had to be processed and cleaned, and so on.

These are coordinated specifications so they are available for use by the Air Force as well as the Navy or the Army.

Mr. HESS. Then all contractors who contract with the various branches of the armed services understand those symbols?

Commander BUNTING. They should sir; yes, sir.

Mr. COURTNEY. Well, the question, Mr. Chairman, I suggest would be whether or not it is in use commonly, or whether optional with the contractor.

As I understand your presentation, so far as the Bureau of Ordnance is concerned, by contractual requirement in the design package, you come out with this language which is in some measure or principally taken from a standard manual within the Department of Defense.

Commander BUNTING. Yes, sir.

Mr. COURTNEY. To that you have added your own contractor's experience, which goes into the shop manual.

Commander BUNTING. Yes, sir.

Mr. COURTNEY. And the operating manual.

Now, the query I think that comes out of that is whether that practice is common throughout the other services. I think you have explained that so far as your relationship with Army Ordnance is concerned, that information would be interchangeable so far as you know?

(Admiral Quinn nods.)

Mr. COURTNEY. But you would learn off a Navy Bureau of Ordnance design package in the way of expressing the method of manufacture or the type of weld or whatever it might be, would be the same as you would read in an Army Ordnance contract or a contractual set of documents; would that be right?

Commander BUNTING. I am not familiar with Army Ordnance.

Mr. COURTNEY. I see a gentleman—Mr. Tann is nodding his head over here.

Mr. TANN. That would be right.

Mr. COURTNEY. Is that right?

Mr. TANN. That would be right.

Of course, we have the standards and we in the Bureau of Ordnance have to promulgate them and use them. All services have the standards and I believe, sir, it gets down to how thoroughly are they promulgated and applied and put on the drawings.

Mr. COURTNEY. It is a question of application?

Mr. TANN. That is right, sir.

It is a question of application.

Mr. COURTNEY. Is that right?

Mr. TANN. Yes, sir.

Mr. COURTNEY. So far as your immediate sister service is concerned, the Bureau of Ordnance, you do find them interchangeable?

Mr. TANN. With the Army, sir, because that, of course, is our principal point of contact. We have very little contact with the Air Force.

So we are not familiar to that extent there.

Mr. COURTNEY. Now, a further question on that subject.

The contractual requirements, if I correctly interpret what you had to say, Commander Bunting, and you, Mr. Tann, and you, Admiral Quinn—the contractual requirements of the Bureau of Ordnance are that this common language derived from Department of Defense manuals, and your experiences are all a part of the requirements that the contractor must perform.

Commander BUNTING. Yes, sir. We have a publication called Ordnance Standard 599.

Mr. COURTNEY. How recent is that, Commander?

Commander BUNTING. Well, the last revision was put out—I understand, on the 18th of February 1957.

Now, this invokes all the various military standards to be used in the preparation of drawings, for example.

Mr. COURTNEY. In other words, the contractor has no option at that point. He must conform to this standard.

Commander BUNTING. He gets this book and he has to make his drawings according to this manual.

Mr. COURTNEY. So that—let me just phrase it a little differently now.

Commander BUNTING. Yes, sir.

Mr. COURTNEY. You spoke of a development contract which I think we all understand. And you said by experience or a rule of thumb that 40 cents out of every dollar in that type of contract goes to documentation, which, of course, includes the symbols.

Commander BUNTING. Yes, sir.

Mr. COURTNEY. That, then, is a matter of contract at that point, so that the contractor is not free to use his own experience and his own methods of expression or his own peculiar shop conventions. He must conform to the standard.

Commander BUNTING. Yes, sir.

Mr. COURTNEY. And that is the point at which you introduce the system which makes it interchangeable in later production contracts between a number of contractors.

Commander BUNTING. Yes, sir.

Mr. COURTNEY. Is that right?

Commander BUNTING. Yes, sir.

Mr. COURTNEY. Further questions?

Mr. HÉBERT. General, further questions?

Mr. DEVEREUX. No, sir; I haven't any further questions. I think it has been explained pretty well what the Bureau of Ordnance is doing and the relationship with the Ordnance Department of the Army.

Apparently, they are working along very well.

Mr. HÉBERT. Well, the reason that we had the Bureau of Ordnance in for the Navy first was to show that it can be done.

Mr. DEVEREUX. Yes, sir.

Mr. HÉBERT. Now, we will have to explore further and see why it is not being done in other areas.

Mr. DEVEREUX. Yes, sir.

Mr. HÉBERT. There is one question I would like to ask, Admiral.

You made the statement that the Defense Department, or the commander here, laid out these broad principles and then gave them to each service, and they implemented them themselves.

Is that correct, Admiral?

Admiral QUINN. Yes, sir. We have to stay within the guidelines.

Mr. HÉBERT. Stay within the guidelines.

Admiral QUINN. Yes, sir.

Mr. HÉBERT. Have you ever been exposed to any policing by the Defense Department, to find out whether you were staying in it or to coordinate what development you had made when you implemented in your own area?

Admiral QUINN. I am not aware of any policing.

Mr. HÉBERT. Policing may be a bad word.

Supervision or surveying.

Admiral QUINN. I know they are familiar with what we are doing.

Mr. HÉBERT. We know they are familiar with it.

The point I am making is—certainly it has been my own personal experience, and observation that under so-called unification——

Admiral QUINN. There is, sir, in each department of the Defense Department, an agency to coordinate such things as these standardizations and drawings.

For the Department of the Navy, that is our Office of Naval Material.

We have a representative here from Office of Naval Material, Commander Stirling.

Mr. HÉBERT. What I am trying to find out: Does the Department of Defense after issuing these glowing, broad objectives, ever come back to find out whether they are being properly implemented, and then making an effort to coordinate with the other branches of the service?

Admiral QUINN. They in principle do. Just the specific actions they take in that, I don't know. I can't give you any example of how such checking-up is done. But, in principle there is an effort made by the Department of Defense not only to disseminate this information, but to see that the receivers are implementing it, sir.

Mr. HÉBERT. Well, that leads me——

Admiral QUINN. Our friends in the Department of Defense, sir, on technical matters do ask questions—not specifically to find out if we are within the guideline. They are generally familiar with our design disclosure package, and I should say of the elements we have in that.

The extent to which this matter is scrutinized is difficult to assess. It is difficult to assess, sir.

Perhaps some representatives from the Department of Defense could give you a much better statement that I can.

Mr. HÉBERT. They can confuse us a little bit more.

What I am trying to get at, Admiral—I am trying to be realistic and practical. Day after day, week after week, month after month, and year after year we hear these same broad statements made about the coordination of the Department of Defense, but we see no evidence of their accomplishing it. Now, of course, you can't answer the question. We don't expect you to. It is something that the Department of Defense should answer.

And in keeping with General Devereux's idea on it, the Department of Defense should be brought in here, and will be brought in here to find out. Now, what have they done to accept this package which obviously is a very effective package—what have they done to place that in the Army Ordnance or in the Air Force, in the same area?

All that we get up here—and that is the reason this committee is in existence, is because they merely issue these statements. After every hearing they issue new statements, with new hopes and new ideals, and great language, of which nothing comes.

It is a job of just constant pounding and constant watchdogging and just constant nagging, to try to get unification out of unification, and it appears to me we are getting further away from unification every day.

Admiral QUINN. I am not in a position——

Mr. HÉBERT. I am not asking you to comment on it.

Admiral QUINN (continuing). To say the extent of the progress that is being made. But progress is being made. It is slow.

My own observations there in the Bureau of Ordnance: I feel that the extent of the coordination that is being provided by the Department of Defense is better, more effective, than it was on my last tour of duty in the Bureau of Ordnance. There are certain areas where the direction that comes from our Department of Defense down through the Department of the Navy is more helpful and constructive. Whether this improvement goes throughout, I just can't say, sir, but it is being made in our technical matters, on ammunition, ordnance, and things like that.

Mr. GAVIN. Let me ask——

Mr. HÉBERT. All right.

Mr. GAVIN. After days and weeks and months of research, you come up with a disclosure package which you think is a very successful one.

Do you make that information and your whole studies and designs available to the Department of the Army and the Department of the Air Force, or do you just keep it to yourself?

Is there some centralized agency that takes all this material and sees that it is given to the other branches of the service, or do you just keep it over there in the Navy?

Admiral QUINN. We do not on our own initiative distribute this to the other departments of defense.

Mr. GAVIN. Why not?

Admiral QUINN. We, in the Bureau of Ordnance, give it to our central coordinating agency, the Office of Naval Materiel.

Now, the Office of Naval Materiel keeps a continuing check and tabulation, and file, on what the different bureaus are doing in matters of this nature, and it would be that office that would further disseminate to the other departments, if it were done.

Mr. GAVIN. Well, do you have anything in the Department of Defense, a centralized agency, for an interchange of any new disclosure packages or any other ideas that come up that are eminently successful?

Admiral QUINN. I——

Mr. GAVIN. In other words, if you spend considerable time in the development of the disclosure package—and it is a very successful one—I should think the information should be made to the other branches immediately, so they can take advantage of what you have developed.

What I am trying to find out: Is there any particular branch in Defense where there is an interchange of ideas or designs or packages or what would be developed that would be helpful to the other branch, or do you just say, "This is ours. We conceived it, developed it," and you hold it and that is the end of it?

Admiral QUINN. What we have is an extension of what they have told us to do. It applies to our particular needs. We would be remiss if we didn't elaborate on what has been given to us in general terms.

Mr. BURK. I think I can give you an example of how specifications, for example, are coordinated between the Army, Navy, and the Air Force.

Mr. GAVIN. That is what I mean, coordination.

Commander BUNTING. And with the other bureaus.

We turn out a specification, and we will put a flag after it, which is "NORD," which means it is the Bureau of Ordnance specification.

These are circulated and are published to the other DOD agencies.

They read it over and if they are interested in it, they can come up and say so, and it becomes a coordinated specification.

Mr. Burk will give you more details on it than I can. He has had more experience on it.

Mr. GAVIN. At that particular point, do you have any instances where they accept it?

Mr. BURK. Yes, sir.

Mr. GAVIN. Such as this design package?

Mr. BURK. Yes, sir.

I can't speak for the period during research and development, but after it is completed and we convert our documentation over into military specification, it is first issued as a military specification "(NORD)," which means it was issued by the Bureau of Ordnance.

However, that specification or information is transmitted on up to the Department of Defense and is circulated out to all the departments, so if they want to pick it up and it is something they are interested in, they can pick it up and say they are interested and want it coordinated with them.

Then we go through a procedure of coordinating that particular specification with them. And if there is something in it that they want, that we didn't have, then—if we can also accept it, we will put it in. If they have to have it, and we can't stand it, then it will become a different type or class.

Mr. GAVIN. Well, after you arrived at the conclusion that you, in the design package, reached perfection, and it gets to the Department of the Army and the Department of the Air Force, do they accept it or do they want to revamp it and redesign it or rechange it so it comes from them, or are they willing to accept the Navy's version of the package?

Admiral QUINN. I——

Mr. GAVIN. We are talking about unification. I want to know whether we do have unification.

If you come up with a package that is perfected, will the Army and the Air Force accept it, or do they want to redesign it so it may be an Air Force package, or an Army package?

Admiral QUINN. Of course, most of our discussions, Mr. Gavin, are on small elements of what we have in our design disclosure package. They are things that are of use and common value to the Army or the Air Force and becomes disseminated through this military specification document.

I think it has been brought out that there is a means of adding to or subtracting to make that useful for all three services. That type of thing is a continuous process in the Department of Defense.

I have noticed essentially no effort on the part of a using department to want to change what the originating department proposed.

We originate a specification on one of our explosive items. In general, the other two departments accept that just as it is, sir.

Mr. DEVEREUX. Mr. Chairman, could I ask a question?

Mr. HÉBERT. Yes, General.

Admiral QUINN. This design disclosure package, the compilation of this information in one place, is in a sense our own method of communicating with our contractors.

Mr. DEVEREUX. Admiral, will a prime contractor or a contractor work from Navy specifications and drawings or will that be transferred or translated into that particular plant's specification, and so on?

Admiral QUINN. They work both from the Department of Defense specification, that is, the military specification, and from our own implementing one, if it is necessary.

Mr. DEVEREUX. Well——

No; I am not talking about the Department of Defense. I mean his own methods and procedures, and so on: Does he work from the Navy specification or does he work from his own symbols?

Admiral QUINN. Oh, he works from ours.

Mr. DEVEREUX. He works from yours.

Admiral QUINN. Yes, sir. If he is on a Navy production contract, he works from our symbols and our tolerances. We require——

Mr. DEVEREUX. He doesn't translate that to his own company's language?

Admiral QUINN. They may have at one time. They don't now, sir, to my knowledge.

Mr. DEVEREUX. They don't now?

Admiral QUINN. That is right for our newer contracts—any exceptions still practiced among the older contracts are being brought into line.

Mr. DEVEREUX. How about subcontractors, are they familiar with the Navy's specification, and so on?

Admiral QUINN. Yes, sir. Our policy is to have each producer, whether prime or sub, have the same information.

Mr. DEVEREUX. And work from the same information?

Admiral QUINN. Yes, sir.

Mr. DEVEREUX. That is put out by the Navy?

Admiral QUINN. The prime contractor, who has subcontractors, would be very much troubled if his subcontractors were bringing things in with different tolerances to what had been specified by the Navy to the prime.

Mr. DEVEREUX. No; I am not talking about tolerances. He may produce the end item the same way. But I am talking about whether he uses the same information and works from the same drawings and the same procedures that are put out by the Navy.

Admiral QUINN. All the ones with whom I am familiar do that. There may be certain exceptions.

Mr. Tann, would you know of any instance where a subcontractor and producer would be apt to use his own drawings and procedures instead of the Navy's?

Mr. TANN. Yes, sir; I think I can illuminate that spot a little bit.

All primes and subs work fundamentally to the Navy specification—BuOrd, in our case—BuOrd specification and BuOrd drawings. The only time that is not done is in connection with the industrial engineering processes in the shop.

I will take this pointer for example.

Let's say we have a shaft here. It has so many threads per inch on this end. Here it is fluted in the center. Here is another attachment on the end, where there are so many threads per inch. By good industrial engineering practices, the prime or the subcontractor would make what is called a process drawing, the first of which would be to take a steel rod and cut it off so long, and to perhaps turn it or grind it to such a diameter before it goes on the other operation. That might be in a pile of operational drawings, for a shaft of that kind, that high [indicating]. We never see those. But the end product of those complies, upon inspection, with the BuOrd drawing for this shaft, with all the convolutions, threads, and what have you, on it. Otherwise, they work right to the drawings.

Of course, as the admiral pointed out, the sub has to work to the same set of specifications as the prime and produce them the same way, or when—if it was the case of something going into a prime contractor's assembly, if the subcontractor had not, the two parts wouldn't go together.

Mr. DEVEREUX. I appreciate that.

Mr. TANN. Yes, sir.

Mr. DEVEREUX. Of course.

You think that there is—with your method of getting out contracts and all—you think there is sufficient flexibility so that anybody within the industry could bid on any of your contracts?

Admiral QUINN. Yes, sir.

Mr. DEVEREUX. And go ahead and produce without——

Admiral QUINN. That is our objective, and we feel we are becoming more and more successful in that work, sir.

Mr. DEVEREUX. You find that the industry is accepting your guidance, if you will, on this proposition?

Admiral QUINN. Yes, sir. There are many evidences of their being pleased with what we are giving them in the design disclosure package.

Mr. DEVEREUX. That is all, Mr. Chairman.

Mr. TANN. May I add one thing to that, sir?

Mr. HÉBERT. Yes.

Mr. TANN. That the derivation of the military standards for standardized methods of transmitting manufacturing, welding, or whatever the operation is, really goes back and has its genesis to the work of the American Society of Mechanical Engineers, the American Society of Tool Engineers, and the American Welding Society. In other words, when we arrive at the military standards, all of these professional societies, with their standards, with which industry is familiar, sat right in with us.

So it is not something—we are not springing, to use the slang expression—something new on industry. It is something that they, in a sense, are 85 percent familiar with already.

Mr. COURTNEY. It is merely a question of getting it into use, as far as the Bureau of Ordnance is concerned?

Mr. TANN. Right, sir.

Mr. HÉBERT. Admiral, to your knowledge and in your experience in the Bureau of Ordnance, has the Department of Defense ever issued a directive to change the method to correspond to another sister service, wherever you are in an area of—not disagreement, but of variation?

Admiral QUINN. The question is: Do I know of a directive or a series of directives from the Department of Defense——

Mr. HÉBERT. Where any problem was resolved by direction of the Department of Defense, excluding the guided missile directive of Mr. Wilson some time ago, which you heard a lot about.

Admiral QUINN. I am not sure that I understand your question, Mr. Chairman.

Mr. HÉBERT. In other words, what I am trying to find out is this: What is the Department of Defense actually doing? Is is merely paying lip service and taking on more Secretaries every day and more Deputy Secretaries and Assistant Deputy Secretaries and issuing new directives every day which have no meaning except a lot of words? Do they actually direct?

Now our concept when the Unification Act was passed—and many disagreed with it, and still disagree with it—was that the Defense Department was to be a guidance department and was to resolve these differences among the services. Today it has grown to 2,400 employees down there, and multiple Secretaries. I am trying to find out if they have unified anything. I see a lot of evidence of disunifying. I am just wondering, have they unified anything at all?

Admiral QUINN. To their credit, sir, I feel confident they have in many areas.

Mr. HÉBERT. Well, now, I am asking——

Admiral QUINN. One of the areas is the technical matter of ordnance.

Mr. HÉBERT. There you have a package which you explained here this morning, which is a very fine presentation. Now, what is the

Defense Department—you can't answer this, undoubtedly—but what is the Defense Department—the committee is going to ask the Defense Department: Have they given the other services the advantage of this presentation or this procedure and told them, "Now, this is the way it must be done?" You have no knowledge of any such directive?

Admiral QUINN. Not per se.

Mr. HÉBERT. Of course not, because none has probably been issued. That is what we are trying to find out. We are trying to get unification to work and trying to get some direction and some guidance from the Defense Department. We are getting very little. There is testimony after testimony that comes before this committee showing that.

I think that is your real problem. Nobody wishes direction from the Defense Department, except to appoint a new Secretary.

Mr. HESS. It is permissive rather than mandatory.

Mr. HÉBERT. It is all permissive.

Mr. CUNNINGHAM. I think that is the whole trouble, Mr. Chairman.

Mr. HESS. Yes.

Mr. HÉBERT. Of course.

Mr. CUNNINGHAM. Admiral, is there any order or anything done by those in charge to compel a purchasing officer, before he goes out and buys any material for any branch of the service—to go and find out if there is already the same material on hand somewhere else?

Admiral QUINN. That is——

Mr. CUNNINGHAM. Or is it just simply up to his discretion to find out if he wants to?

Admiral QUINN. That is one of our checkoffs; in the preparation of the contract to ascertain whether this is available elsewhere, that is one of the steps we take.

Mr. CUNNINGHAM. You see, several years ago when you had the hearings that resulted in the bill to authorize a single catalog, we found some departments had a 200 years' supply and another department buying the same thing, of certain articles.

Admiral QUINN. We insure against that occurring in the Bureau of Ordnance by a step we call our checkoff list. That is one of the steps that we take before we go ahead——

Mr. CUNNINGHAM. Admiral, maybe I shouldn't be questioning, because I was out awhile, but before I left I heard the commander make a statement that led me to believe that it was simply up to the discretion of the purchasing officer whether or not he went and consulted the single catalog, and he had the power to go ahead and buy, regardless of it.

Is that true or not? I gathered that from the statement of the commander, that that is permissible.

Admiral QUINN. I am inclined to think that the inference may have been in error, sir.

Do you recall?

[Looking at Commander Bunting.]

Commander BUNTING. I don't recall making exactly that statement, sir.

Mr. CUNNINGHAM. I understood you to make the statement that he had the privilege of going to consult this single catalog, but your statement contained the inference, to me, that it was not mandatory;

it was just up to him whether or not he did it. I thought if that is the case, there isn't any use in having the single catalog.

Mr. HESS. He made no such statement.

Commander BUNTING. I don't recall.

Mr. CUNNINGHAM. I gathered it from your testimony.

Commander BUNTING. Along with Admiral Quinn's statement in defense of the Department of Defense, as an example of what they have done—they have a manual in the H series; the one I think of in particular is H6–1, which is a nomenclature manual.

Well, semantics play an awfully big part in trying to buy things. One designer calls it a bracket and another one calls it a hanger and another calls it a strap. They all have the same function. We have even put this into our contracts and have told the contractors to look in here first and make sure we call it the same thing, so then we can identify pieces later on.

That is one of your problems in standardization, is to be able to identify what you are talking about.

Mr. CUNNINGHAM. You need a universal language in the departments; is that it?

Commander BUNTING. Well, and this they have attempted to come up with, and they have a manual, and it has caused some arguments, but people have complied. They say, "You will call it this and nothing else." And that is it.

Mr. HÉBERT. That is the way to do business.

Commander BUNTING. That is what this book does. Especially in your repair parts program, where you have a multitude of small pieces, some call an item a plunger, another calls it a piston, and others something else. Well, they have them defined as to function—if you are going to have it do a certain job, you name it this, and nothing else.

We have attempted to crank this into our development contracts, as our documents are prepared, to at least have the right names on them. This is something that is not going to occur overnight, but it is a step in the right direction. I think it is the direction that you want it to go.

Mr. CUNNINGHAM. Thank you.

Mr. HÉBERT. Well, thank you very much, Admiral, and thank your staff also. The committee has now found out that something can be done, and our further examinations will be in the area of finding out why it hasn't been done. I am talking with particular reference to the missile program, the airframe program, and the air-engine program, which we will go into, too, in that connection. We will explore the area, General, that you indicated, too, specifically to the airframe factories.

Mr. DEVEREUX. Thank you.

Mr. HÉBERT. Thank you very much, Admiral.

Admiral QUINN. On behalf of Admiral Withington and his assistants, we want to thank you, Mr. Hébert, for inviting us to come today.

Mr. HÉBERT. Thank you very much, sir.

The committee will stand in recess until tomorrow morning.

Mr. COURTNEY. Tomorrow morning at 10.

That is another subject, Mr. Chairman.

Mr. HÉBERT. Yes; that is another subject.

(Whereupon, at 11:50 a. m., the subcommittee adjourned, to reconvene at 10 a. m., Friday, July 12, 1957.)